The Builder.

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New Amsterdam.

THERE is no European city which shows more markedly than Amsterdam modern prosperity, mingled with remnants of the past. The numerous canals, with the roughly-paved and elm-shaded streets by their side, the houses above them with their storehouses at the top, mark the Amsterdam of the past. The various new buildings which have lately been erected, the increase of handsome dwelling-houses which are spreading out to the south and south-east of the town, near the Vendels Park, and the course of the Amstel, show very noticeably the material prosperity of Amsterdam. To some extent this increase of the town is the more interesting at the present time, because it may in some respects be attributed to the North Sea Canal. This important work has now been ten years in operation, and it has to a considerable extent made Amsterdam a seaport. It is true that in one sense Amsterdam was a seaport before the North Sea Canal was opened,—but the Zuyder Zee is full of sandbanks, and is little more than an inland lake, with next to no trade. The dead cities of the Zuyder Zee have been too well portrayed in M. Havard's work for it to be necessary to describe them afresh. But it is obvious that "dead cities" and a treacherous navigation for large sea-going vessels are not likely to do anything towards increasing the commercial prosperity of a town. Nor has the North Holland Canal a large or a direct enough route to the sea. But the fifteen miles of canal from the North Sea coast to Amsterdam have enabled the largest vessels to come right up to Amsterdam. The produce of Java and the East is landed in the very centre of the shops of Amsterdam. Hence the prosperity of this town by means of the canal has received an enormous impetus. The spot where the great gates admit vessels from the sea, a few years ago a heap of barren sandhills, is now beginning to be populated, and it is probable that in no long time, not only will fishermen in quaint dress, and seamen and excursionists from Amsterdam, be seen here, but that it will become a kind of Dutch Brighton,—a rival to the favourite Scheveningen. A train service and a steamboat service of fifteen miles will make it a suburb of Amsterdam.

Turning, however, to Amsterdam itself, undoubtedly the most noticeable building recently erected has been the Rijks Museum, which was opened at the end of last year. It gives Holland what it wanted before, and what its great place in the history of art demanded,—a national picture-gallery. Within this gallery are now united, so far as pictures are concerned, the collections from the Trippenhuis, the Museum Van der Hoof, the Stadhuis, the Huisschenhuis, and the Pavilion at Haarlem. The whole of these pictures now form a single collection, and a catalogue of them with fifty wood-engravings has been published.* The fact that the Van der Hoof pictures are separately numbered, and also that the pictures throughout the Museum are not placed in consecutive numbers, makes the catalogue a little difficult to follow: in every other respect it is an excellent compilation. As to the building itself, of which Mr. P. J. H. Cuypers was the architect, it must be confessed that it is disappointing. The site is excellent; there is ample space in front, but the building itself is neither dignified nor picturesque. It is large, in a way imposing, but commonplace in design, and the want of dignity is not compensated by the relief of the coloured tiles and the stonework which relieves the brickwork. The central gable is surmounted by a figure of Victory. The alto relievo above the archway, 23 ft. in length, contains an allegorical figure of the Netherlands, who is surrounded by Wisdom, Justice, Beauty, and Truth, and is receiving the homage of the Dutch artists. Side reliefs also depict various allegorical subjects, but, as has been already said, these are, after all, but very subsidiary parts of the building when it is regarded as a whole. Internally the Gallery of Honour in the centre of the building is a fine passage, with cabinets at the side, but the decoration throughout is altogether disappointing. The walls of the rooms are for a certain height painted some subdued colour,—dark red or dark blue,—and the upper part above the pictures is decorated with various designs, most of which might aptly be described as fit for neat wall papers, but are altogether below the standard of a large National Gallery. The world-celebrated picture of Rembrandt, which is generally called "The Nightwatch," occupies the place of honour in the Rembrandt Room, which forms the end of the Gallery of Honour. This great picture, with its life-sized figures, therefore, is seen in the distance as the Rembrandt Room is approached from the Gallery. The Museum, indeed, has now made easy of access to the amateur the choicest collection of pictures by the Dutch masters in the world, and its erection must thus be noted as an event of interest, not from an architectural point of view only, but from that of the history of European art.

The neighbourhood of the Ludsche Plein, as the "place" a little to the north-west of the Rijks Museum is called, is noticeable by its new handsome houses in French style. The Gymnasium, which may be seen between the Ludsche Plein and the Rijks Museum, was opened last year, and is another of the important buildings which have lately been erected in Amsterdam. It is in a semi-Classical style; that is, the main structure is of brick with much stonework of a highly Classical kind, and a portico surmounted by a Classical figure. This, again, though a striking building, also gives the impression of a want of grasp in the general design and of an attempt to make up for it by putting Classical adornment about the building. St. George's Hall, at Liverpool, may invite criticism as regards the propriety of its style for a commercial town in this century, but certainly it is of all modern buildings the truest Classical building, because it is Classical in conception, whereas one such as the Amsterdam Gymnasium is really only Classical in the decoration.

A building in its way of not less importance than those already referred to still further emphasises the growing importance of Amsterdam; this is the new Central Station, into which the several lines which converge at Amsterdam will ultimately run. It is placed at the north of the town, near the quays, and will thus be close to the various starting-places of the steamers. It is a building of considerable length, and distinctly striking in character, though simple in design. It consists of a central part, which in its turn is formed of a central tower and side towers, and the wings are considerably lower, stretching out east and west. The station, of red brick with stone facings, stands looking towards the town, and being on somewhat higher ground than it, with a considerable open space in front, it will prove to be a very satisfactory example of a well-designed station, and possessing considerable architectural effect. At the commencement of these notes we mentioned the extension of the town along the Amstel.

This part consists mostly of private residences; these again are mostly of red brick, without much picturesque effect, but sober, substantial edifices, with a certain quiet dignity, which causes them to harmonise well with the commercial character and general attributes of Amsterdam. The architectural features of Amsterdam are too well known to be dwelt on here; no one goes to Holland as he does to Flanders for the sake of the beautiful examples of Gothic architecture. But the

* Catalogue des Tableaux du Rijks Museum. Par Abr. Bredius. Publié avec l'autorisation de Son Exc. le Ministre de l'Intérieur. Amsterdam: Tj. Van Holkema. 1885.

cheerful sobriety of the domestic architecture of Amsterdam is in some respects not at all unworthy of consideration ; and it is unquestionable that no one who wishes to keep himself abreast of the progress of modern architecture abroad as well as at home should fail to take an opportunity of becoming acquainted with the various recently-erected buildings in Amsterdam, of some of which a few brief indications have just been given, and which serve to mark the rapid progress of this remarkable city.

THE RAILWAY MOVEMENT OF 1886.

NINE main lines of railway radiate from London, connecting the metropolis with the chief ports and seaside towns of the kingdom. If to these lines we add the North-Eastern Railway, which forms an integral part of the system we are referring to, the aggregate length of trunk lines and ramifications amounts to 9,673 miles (we take the figures from the last published number of "The Index to the Railway System," 1879-80). By these ten lines Yarmouth, Dover, Brighton, Portsmouth, Southampton, Plymouth, Bristol, Liverpool, Newcastle, and Hull are connected with London in a system of inter-communication that stretches in latitude from Berwick to Falmouth, and in longitude from Ramsgate to Milford Haven.

This great network of lines, which forms nearly eight-tenths of the length of the railways of England and Wales, naturally divides itself into two groups. Of these the smaller, lying to the south and east, contains the Great Eastern ; South-Eastern ; London, Chatham, and Dover ; London, Brighton, and South Coast ; and London and South-Western Railways. It is 2,417 miles in aggregate length, and the lines which compose it, running chiefly through agricultural districts, derive only 8 per cent. of their gross revenue from the carriage of minerals. Their principal disadvantage is that the formidable cost of their London stations is divided over so short a length of railways, a fact which raises the capital cost of construction by nearly 10,000*l.* a mile above that of the northern lines.

The second group of railways includes the Great Western, the Midland, the London and North-Western, the Great Northern, and the North-Eastern lines. Their aggregate length is 7,256 miles, or close upon three times that of the southern group. While costing, as before intimated, some 10,000*l.* a mile less than the latter, their great disadvantage is that 25 per cent. of their revenue is derived from the carriage of minerals,—a business which is not only very poor remuneration in itself, but which, by keeping other traffic off the line, reduces the gross earnings per mile by more than 10 per cent. below that of the non-mineral-carrying group of railways.

The cost of the southern lines, thus denoted, averages 53,170*l.* per mile. The gross revenue is 4,521*l.*, or 8·3 per cent. on the capital. The co-efficient of working expenses is 51·4 per cent., and the resulting net profit is 4·04 per cent. on capital outlay.

The five Northern lines have cost on an average 43,632*l.* per mile. Their gross revenue is 4,064*l.* per mile per annum ; 25 per cent. of which is derived from the carriage of minerals. This revenue is equal to 9·2 per cent. on capital, but the average coefficient of working cost is so far increased by the large proportion of mineral traffic as to stand at 57·1, instead of 51·4 per cent. of revenue. Thus the net profit divisible on capital is reduced to 3·95 per cent. all round.

Thus far the relative advantages and disadvantages of the two groups of lines are not widely different in their balanced results. But for more than ten years prior to that of which we have compared the analyses, a movement had occurred in each of the two groups, in opposite directions. The net profit of the Southern lines had been advancing, that of the Northern had been declining. The reason was that the capacity of the former for traffic, as they were not choked by the low-speeded mineral trains, was so superior to that of the latter, as to allow of increment of revenue without corresponding increment on capital, while the reverse is the case with the lines that carry three descriptions of traffic. From 1871 to 1880 the average net return on capital on the Southern lines (omitting the London, Chatham, and Dover) rose from 3·78 to 5·16 per cent. ; while that of the five Northern lines fell from 5·65 to 5·23 per cent. The result of the accounts of the last half-year shows an acceleration of the same double process.

In the half-year ending June 30th, 1886, the Great Northern was the only one of the five Northern lines which did not show a decrease in revenue. The balance of the loss on the five railways was 399,918*l.* for the half-year. Against this has to be set a saving in working expenses on three of the five lines, the increase in the working expenditure on the Great Northern being nearly as much as the increase of revenue, and the Midland showing increased working expenses with declining income. The balance of saving was 111,580*l.* ; and the net loss, as compared with 1885, on the five lines for the half-year was 277,338*l.*, or 38*l.* per mile for the period.

During the same half-year the Brighton Railway showed a decline of 18,700*l.* in its gross revenue ; allowing for which there was a gain of 31,672*l.* on the income of the southern group of lines. The working expenditure, at the same time had been reduced (with the exception of an increase of 14,300*l.* on the Great Eastern), the balance of reduction being 44,953*l.* This saving, added to the increase of revenue, shows a gain to the group of lines in question of 76,625*l.* for the half-year, which is equal to a net gain of 31*l.* per mile for that time. Thus while the non-mineral carrying lines show an improvement at the rate of 31*l.* per mile, the mineral carrying lines show a deterioration of 38*l.* per mile, for six months in each case.

This movement is further illustrated by the fall in dividend which, on the five northern lines, has occurred since 1882, in which year the normal growth of railway income was arrested. The dividend of the London and North-Western Railway has been reduced by 21 per cent., from 7 to 5½ ; that of three others of the lines by from 22 to 25 per cent. ; and that of the North-Eastern, with its 36 per cent. of earning from mineral traffic, by no less than 40 per cent., or from 7½ to 4½. On the other hand, in the southern group, there had been a decline from 4½ to 3½ per cent. in the London and South-Western dividend while the Brighton and South-Eastern lines divided each ¼ per cent. less, the Great Eastern ¼ per cent. more, and the Chatham line rose from nil to 2 per cent. for its preference stock.

The double mode of comparison above adopted has a double value. To ascertain the real earning capacity of a railway the net percentage of revenue divisible over the entire capital is the true test. For the permanent investor this is the desirable information. But for the speculator, the rate of dividend, which applies to a portion of the capital, is the regulating feature. As to this, it should be borne in mind how much more favourable to the original or permanent shareholder the French distribution of capital has proved than that adopted in the United Kingdom.

Without attempting to foretell the future, it may be fairly concluded that so long as the determining causes remain the same the phenomena observed are likely to continue. Before the introduction of the mineral traffic on our trunk lines, working expenses were (in some cases) as low as 40 per cent. of revenue, and dividends reached 10 per cent. Each of these conditions still exist in certain cases ; that is to say, that homogeneous traffic, running all trains at the same speed, and all stopping at the same stations, is yet worked at or below 40 per cent. of gross income, and is found, in well-known cases, to pay upwards of 10 per cent. dividend. But the average return on capital of the English railways is little over 4 per cent. per annum, and, as we have shown by unquestionable figures, the co-efficient of working expenses increases, and the net profit consequently declines, in close proportion to the share borne by the mineral traffic in the production of gross revenue.

If the shareholders of the lines which are undergoing a marked and steady decline in their net profits, a decline explained and anticipated in the evidence before the Select Committee on Canals, in 1883 (see pp. 232, 233, 236, and 245 of the Appendix to the Report), are contented to see their property steadily decline, while that of their neighbours, who avoid unprofitable traffic, increases or at least remains stationary,—they are, of course, their own masters in the matter. But it is well that the facts should be put before them. And it may be stated, without any fear of contradiction, that any misfortunes that, even if they do not directly spring from, yet accompany, neglect of the time-honoured canons of business, are apt to attract blame rather than sympathy when they can no longer be concealed. That the carrying value of one set of lines should decline by from 20 to 40 per cent., while that of another set of lines is substantially uninjured, is a fact of unmistakeable import. It is hardly credible that, in a people which used to be so eminently composed of men of business, this should go on year after year without any attempt on the part of those who are the losers to investigate the subject thoroughly. So long as the question is regarded only in the block,—so long as people only speak of the gross traffic of the railways of a country,—it is easy to throw the blame of declining dividends on uncontrollable causes. It is not, however, matter of opinion, but of fact, that those railways which carry in large quantities a description of traffic that can be far more cheaply carried by water, and that is carried by water in France, Germany, Russia, and, as a rule, wherever,—out of England,—water carriage is available, show a declining prosperity, while those railways that are nearly free from such traffic show a stable or an increasing prosperity. This has been long since brought before public attention, to the advantage, no doubt, of those persons who seek rather permanence of investment than speculative profit. In the last six months the movement has assumed more rapidity than heretofore. The fall of ½ per cent. in the London and North-Western dividend, and of 1¼ per cent. in the North-Eastern dividend, while the Great Eastern and the South-Eastern dividends rise by ¼ per cent. each, is an *argumentum ad crumenam*. It may, of course, be neglected, and the advice of those who call attention to it may be despised, but the facts which we have cited,—and there is an ample store of them,—are such as to render it highly probable that the argument will continue to be urged by the disagreeable advocacy of shrinking dividends until the matter is thoroughly investigated, whether as a mechanical question or as a question of account.

NOTES.

FROM the House of Commons on Monday last Mr. Gent Davis asked the First Commissioner of Works if he would reconsider the matter of the proposed flights of steps which were to be intruded into Westminster Hall in connexion with the so-called "Restoration" of the Hall by Mr. Pearson. Mr. Plunket's reply was evidently in reality dictated by Mr. Pearson, and we can only describe it as exceedingly misleading. The substance of it was that the proposed stairs merely replaced stairs which had always existed in the same position. This is not the fact, and it is a very disingenuous statement. Capon's plan shows two symmetrically-arranged straight staircases at the north end of the hall, on each side of the doorway, and apparently concealed by screen walls. This is quite a different thing from shouldering a great staircase, with two flights at right angles, into the space on one side of the doorway. On the west side Wren's plan shows two very small and not noticeable staircases, the date and origin of which there is nothing to show. That

Mr. Pearson has recognised the advisability of paying some attention to criticism from outside appears to be implied by the statement of Mr. Plunket that the western staircase is to project 9 ft. 6 in. only, and not 15 ft. as shown in the officially-published plan. This is something gained, at all events. Of course, the real objection to the whole thing is the absurdly futile object for which these large staircases are to be made, to get into some rooms between the buttresses which it is pretended are a restoration, and on which the architect, by his own admission, merely wrote "committee rooms" in order to give some pretext of a use for them. It is, however, we fear, useless to appeal to a Parliament which is entirely indifferent to architectural subjects, and is ready to accept and to vote for anything which the First Commissioner of Works for the time being puts before it.

THE thirty-third number of the *Statistical Abstract for the United Kingdom*, recently issued, is an improvement on its predecessors, and contains some information of the highest statistical value. Among recent additions to the contents of the volume, which has grown from 173 pages for 1883 to 200 pages for 1885, is a return of the tramways of the United Kingdom, drawn up in the same form as the similar returns for the railways. The aggregate length of these lines has risen from 158 miles in 1876 to 811 miles in 1885; and the number of passengers accommodated from 146 millions in 1878 to 364 millions in 1885. The total capital has risen from 2,186,304*l.* in 1876, to 11,817,586*l.*, so that a mile of English tramways costs considerably more than a mile of American railway. Working costs, for 1885, come to 75 per cent. on gross receipts, but still allow a net receipt of 5·41 per cent. on capital. The most encouraging feature in the return is the increase of the net profit on capital, which has risen from 4·62 in 1883 to the above-named figure. In 1879 the rate of profit was 4·85 per cent. The great defect in this table, as also in the railway tables which precede it, is the absence of information as to the number of men employed, which it is very desirable to know. This information is supplied with regard to our registered shipping. Exclusive of masters, 198,781 persons were employed in our merchant navy in 1885, which is a decline from the highest total reached, viz., 203,720 in 1872. But with the increase of steam navigation the number of hands required in proportion to tonnage is continually on the decrease. In 1871 there was one hand for every 28 tons of shipping; in 1885 one hand worked 37 tons of shipping.

ONE of the latest archæological finds has just occurred in the neighbourhood of Bury St. Edmunds, the new sewerage works of which are being carried out at West Stow Heath, between four and five miles from the town. In digging a narrow trench the workmen cut through two pottery kilns of the late Roman period, similar to those which were excavated about six years ago by Mr. Prigg, a well-known antiquary of Bury, who believes that Stow Heath, now wild, remote common, had, at the close of the Roman occupation, a very considerable population, and that it was a suburb of the Roman station at Icklingham. It is well known that the centre of the western portion of the heath, known as Wildham, is occupied by a Saxon cemetery. The kilns in question, fragments from which will shortly be placed in the Athenæum Museum, were about 5 ft. in diameter, with walls 2 ft. 8 in. in height, composed of tempered clay, ruddy from repeated firings. The one was filled with blackened earth and bits of broken vessels which had been spoiled in the firing, and had been thrown aside as "wastes." Many of these were elegantly formed globular vases, with handles in buff and fawn coloured clay. The second kiln was more dilapidated than the first, but contained more interesting remains, the vessels being principally jars and saucers, and of a dark colour, leading to the inference that it had been used as a "smother kiln" for the production of black and slate coloured pottery. There was also found a fragment of fine red ware, with coral-coloured glaze, forming part of a bowl, ornamented with the figure of a wolf-like animal. The progress of these sewage works will be watched with great interest by antiquaries, for there is no doubt but that, in the various levelling operations for the construction of filter beds, numerous ancient sites will be met with and probably many Roman relics discovered. As the heath upon which the works are carried on is now the property of the Bury Town Council, there is every likelihood that a strict supervision will be exercised over the workmen, and that whatever is found will be carefully preserved.

MR. CHARLES W. HASTINGS has edited three little volumes which are of value as books of reference. These are "Water Works Statistics," the sixth issue; "Gas Works Statistics," the eighth issue; and "Gas and Water Companies Directory," the tenth issue. Of these, the first gives particulars in the case of 296 towns, tabulated under the headings of name of town, source of supply, gravitation or pumping, quantity raised per annum, assessment charge, meter charge, price per 1,000 gallons, number of meters in use, if constant service, and dividend. The information given under the third and fourth heads, however, is very small, and there is no indication of the incidence of the water-rate on the population, or of the difference in the cost of ordinary supply, and of sale for trade purposes. It is more than probable that the authorities decline to furnish this information without the stimulus of a Parliamentary order for an annual return. For the gas companies such Parliamentary returns are available, and supply (as we showed on June 19th last) tabulated totals which Mr. Hastings does not give. Thus, with the exception of twelve pages of foreign gas-works statistics, more information is to be derived from the Parliamentary return than from Mr. Hastings, and at a much lower price. "The Gas and Water Companies Directory" tabulates the date, Act of Parliament, capital, and dividends, of a large but uncounted number of companies, the names of principal officers, the populations, and the distances from London. But the necessity for purchasing three books, at the price of 10s., to obtain the information of which the greater part, viz., that relating to the gas works, is to be purchased from Messrs. Hansard for 1s. 2½d., is not to us self-evident. Still the books are very handy.

IT is to be hoped that a really liberal response will be given to the appeal of the Trustees for the preservation of the unique little church of St. Lawrence, at Bradford-on-Avon, which was built by the Saxon Bishop Aldhelm, and was alluded to by William of Malmesbury. Probably Aldhelm's original church was of wood, and although the actual date of the present stone building is unknown, there is no doubt but that it is one of the earliest of the kind in this country, and one of the most interesting, if only for its singular measurements. The nave is 25 ft. in length and as many in height, being therefore of unusual and almost disproportionate loftiness, while the chancel is only 13 ft. in length, and the chancel arch but 3 ft. across. St. Lawrence has in its lifetime narrowly escaped destruction, having been used both as a school and dwelling-house; but, fortunately it was saved from degradation by the late vicar, who repaired and replaced the altar in it, after discovering the chancel-arch and step during the removal of a stack of chimneys. Though the walls are of great thickness, they have developed a considerable degree of insecurity, which requires careful looking to, having been filled in with conglomerate, which has mouldered away in the course of ages.

A CORRESPONDENT, well known in the architectural world, writes:—"When I was over in Ireland I was greatly struck by the originality and beauty of the details of the Classical buildings in Dublin.—the Custom House, the Four Courts, the City Hall, the Queen's Inn, &c. I do not think that the details of these buildings have ever been published; yet they are very remarkable. There are circular "landing-places," staircases, ceilings, corridors, &c., which struck me as being admirable examples of design. There is also some very pretty and ingenious planning and interesting construction. Would it not be worth while for some of the architectural students to go over to Dublin, measure, and make geometrical drawings of these buildings, or parts of them? It seems to me strange that they should have been overlooked. The detail is much more 'free' than our Classical work here, and yet it thoroughly escapes the wildness of French or German eighteenth-century work. It is not unlike the work of the brothers Adam, but bolder."

THE Metropolitan Board of Works resumes its weekly meetings this week, after the recess. We see from the *agenda* paper that a letter has been received from the Home Office, transmitting copies of a letter from the Town Clerk of London, and of a Report of the Medical Officer of Health of the Port of London, complaining of the condition of the Thames as affected by the sewage of London, and stating that "the Secretary of State wishes to remind the Board of the terms of the letter addressed by him to the Board on 19th May last, and hopes to learn at an early date that the Board has adopted more effective remedial measures than those now employed"; also asking what objection there is to the immediate setting in hand of the treatment of the liquid residue of the sewage. We share the hope expressed by Mr. Matthews, but we are not very sanguine of its realisation "at an early date."

IT is much to be regretted that the narrow throttle at the Holborn end of Leather-lane seems likely to be perpetuated by the rebuilding of the premises at the junction of that street with Holborn on their old lines, instead of seizing the opportunity to commence the operation of widening the thoroughfare. Of course the value of the frontage to Holborn is considerable, but public interests ought to have prior consideration in so important a matter as improving street communication. Other alterations in the neighbourhood might render Leather-lane eventually a thoroughfare of some importance; but the possibility of this development will be shut out for a good many years to come by the re-erection as now proceeding.

ARCHITECTS may be interested to know that in some quarters of the land that kind of immortality is being conferred on them which consists in the application of proper names as the distinguishing names of streets. Going through a new speculating builder's neighbourhood the other day, in the outskirts of a large provincial town, our eye was caught by "Butterfield-street" on the end house of a row of "desirable" two-storied dwellings. Any doubt whether this could refer to the eminent architect of that name was dispelled on reading at the next street-corner "Bodley-street," and on the same property we successively came on Wyatt-street, Paley-street, Goldie-street, and Nesfield-street. There may have been others which we missed; as the list stands, it is not easy to see what particular principle guided the selection; though the majority are among those generally regarded as especially "church architects." The names may have been selected from those who contributed to local architecture. It is a delicate compliment, at any rate, from a builder to the architectural profession, and it is to be hoped that eminent architects whose names are not in the list will not feel jealous. Their turn may come.

SPALDING, Lincolnshire, is ninety-three miles from London, by the Great Northern Railway. The charge made for the carriage of two tons of potatoes and delivery at Spitalfields Market the other day was 2*l.* 13s. 4d., being nearly 3½d. per ton per mile, which was 12s. 3d. more than the selling price of the vegetables. From Tonbridge to Bath is 137

miles. The sum of 5s. 9d. was charged the other day for a consignment of half a cwt. of plums from the former to the latter place. This is at the rate of 1s. 8d. per ton per mile. Under these circumstances it is not surprising that an arrangement has been made for sending fruit and vegetables from Sittingbourne to London by water, and yet fruit is just one of those things which can best afford to pay for speedy transport. There must be something thoroughly unsound in a system of charges which is thus prohibitory of the inland transit of vegetables. The same weight of plums could have been sent from America for 8d. This comes of the "policy" of the railway managers in charging on every item what they think it "can bear" without reference to either cost of carriage or convenience of home products. Such a policy means inevitable disaster.

THE TRIUMPHAL ARCHES OF THE ANCIENT ROMANS.*

SPAIN is a country possessing a great many remains of Roman times which would very amply repay an investigator on the spot, and their importance would justify the publication of an extended description. There are many triumphal arches still remaining, mostly of plain design and workmanship, but well deserving notice. One of the most interesting is at Coppara in Catalonia. It is a quadrangular building, having an arch on each face, with moulded architrave, pilasters, and impost. There are plain engaged composite columns not quite at the angles of the composition, but just clear of them. These occur to the front and back elevations, the two side fronts having small pilasters only. There are large pedestals on the ground level to each of the principal elevations, which once probably supported statues. There is a very low attic above the main cornice, with two rows of inscriptions.

The fine Roman bridge of Alcantara has a plain single arch spanning the roadway in the central pier, with plain impost and pilasters, but the whole, judging from Laborde's engraving, had been much altered prior to the Peninsular wars.

Another characteristic design is at Bara, also in Catalonia. The opening is lofty for its width, with a semicircular arch springing from moulded imposts. There are two fluted pilasters right and left, the end ones being returned to the side elevations. The projection of the pilasters is so small that the entablature above continues over them without break. A single line of inscriptions occupies the centre of the otherwise plain frieze. The order is Corinthian. The pilasters and jambs rest on a plinth of stonework boldly channelled. It stands in the midst of a plain, and a Roman road passed beneath it.

Another monument of much interest is the arch at the approach to the bridge of Martorell, near Montserrat. The great bulk of the bridge is now of later work, but the triumphal arch still stands, though in poor condition. There is in the centre a plainly-moulded arch springing from imposts and pilasters, while at the angles are returned pilasters, fluted, of the Corinthian order, the entablature being plain and simple, and there being but a blocking course above it instead of an attic. The composition, as in the former instance, stands on a plinth of deeply-channelled masonry, but here there is a moulded base in addition.

At Cabanes, outside the present city, are the remains of a bold single arch, formed of massive stones unmoulded. At present this striking monument consists only of the arch and its supports, there being two massive piers which have large moulded imposts and plinths carried around them.

The triumphal arch of Merida, in like manner, consists at present but of two arches of massive stones, one parallel to the other, and attached by masonry in large blocks, there being a plainly-moulded impost to the outer arch.

The proportion of these Spanish arches cannot be laid down to any one rule; each has been designed on its own.

The number of triumphal arches in Africa is large, and there appears to have been hardly a city which was not adorned by one or more. Several of these merit attention on account of the purity of their designs, and from their remaining in fairly good condition they can be studied with additional advantage. The number remaining has never yet been determined, and, in fact, owing doubtless to the large amount of unexplored country, it may be doubted if the number is yet known. Several sites of Roman cities appear hardly to have been interfered with for many centuries; others have been covered with sand.

At Djémilah, the ancient Cuiculum, the Roman city appears never to have been occupied by the Arabs, and the plans at least of the ancient buildings remain as they were left by the early inhabitants. A fine triumphal arch remains at the entrance to the Forum of the town, erected to the glory of the Emperor Caracalla, his mother Julia Domna, and his father Septimius Severus. The correctness of designating such an arch as this, erected away from Rome, by the title of an arch of triumph, is proved by the inscription itself over the principal opening, where, after giving at length the titles of the persons already named, it states that "this arch of triumph has been erected by virtue of a decree of the decurions." The design is a very effective one, there being a plainly-moulded central arch, two detached columns right and left of it (or rather indications where the columns had been), and as many pilasters; then, two plain niches with semicircular heads, one on each side with a column again at each angle. Enough of the attic, with the inscription, remains to show that the proportion was probably very similar to some already noticed. It was the intention of the Duc d'Orleans, in 1839, to have this fine arch taken down stone by stone and transported to Paris, and the order was actually given by the then Minister of War. It is in very shattered condition, and the next earthquake will doubtless bring the whole to the ground.

At Hammam, the ancient Assura, is another arch, of less pure, but still of very characteristic, design. It consists of a plain archway, having engaged columns which support an architrave and pediment, attached to the front of the composition, which terminates by larger columns at the angles, which have carried the main cornice. Above is an attic, now much ruined.

At Mokthar is another arch, built of massive materials, of the Corinthian order, with highly elaborate ornaments. There is a central semicircular arch, and there were two niches left and right. It is apparent that the arch stood at the approach to a bridge over a ravine at the extremity of which it stands. The width is about 45 ft., and the thickness 12 ft. The whole of the upper portion is ruined. There is a second triumphal arch among the ruins of this town, also of the Corinthian order, with only a few decorations of a very simple kind. There is an inscription, in fragmentary condition, on which Dr. Davis read a dedication to the Emperor Trajan.

There is a beautiful arch at Hydra, in fairly good preservation, having been partly cased in later masonry. It has a plain unmoulded semicircular arch, without an ornamental keystone, and springing from a moulded impost. This is flanked by pilasters 2 ft. 4 in. in diameter, and plain detached Corinthian columns. There are pilasters just clear of the extreme angles, and there is an attic with a cornice. The sides are quite plain. In general design it is not unlike the arch of Djémilah, but it does not possess the side niches which occur there. There is a very legible inscription on the architrave, with a dedication to the Emperor Septimius Severus Pertinax. The extreme width is 48 ft., the thickness being 12 ft.

The arch at Tebessa is now the northern gate of the town, but it was originally detached, with four faces, one to each of the four cardinal points, with four columns to each. It is a fine monument, built of a fine grained limestone, and appears to have had the peculiarity of a small turret-like upper portion, also with four columns over each arch.* There are inscriptions on each architrave, and it appears to have been erected by Cornelius Egrilianus in honour of Severus and Julia Domna.

At Staitla is another arch, about 41 ft. wide, and 11 ft. 6 in. deep. There is a central archway, 18 ft. 6 in. wide, but the architecture is a poor specimen only of the Corinthian order. The name of Constantine the Great may be read on the façade. A paved street still runs up to some ruined temples, the street having been flanked by pilasters; and entrance is given into the square in which the temples stand, by another arch, which appears also to have been a triumphal arch, having a wide semicircular central opening, and two smaller lateral arches; the whole design being in excellent proportion and of the Corinthian order.

The Arch of Zana is a thin structure formed of a fine semicircular moulded arch springing from a bold pilaster, with a carved cap on each side. There is a somewhat stunted Corinthian column on each side, unfluted, around which the entablature breaks. The frieze is pulvinated. The composition terminates by a width of wall surface beyond the columns, around which the entablature returns. Only a few stones remain of the attic. The arch stands alone in the midst of a ruined waste.

The Arch of Lambessa, believed by Mr. Graham to be the Hall of the Prætorium, is so much like a triumphal arch that it is included in this list. It is a large square building, perhaps the largest arch in Africa, formerly very much buried. There are three arches on each face, one large and two of smaller size, with a central arched opening over the central one. Small plain Corinthian striplike pilasters divide the arches from each other, and stand in tiers over each other, there being a small plain entablature above the ground-floor arches. That above, terminating the composition, is very much ruined, only the architrave and a few stones of the frieze remaining. This monument is built of rather moderate-sized stones, well put together.

At Sidy Abd Etabas is another monument, stated by Shaw to be a beautiful triumphal arch. At Tripoli is another, apparently a quadrilateral structure; but it is probable that the notices of the monuments already referred to in the old province of Numidia alone will be considered sufficient to call attention to the great number existing in this but little explored country, and to show that it has possessed more than the wild beasts and the Numidian marble which Pliny believed were its only remarkable productions.*

In the provinces of Istria and Dalmatia, so rich in remains of the ancient Romans, are some arches which demand our notice. The foremost place must be given to the beautiful arch at Pola (illustrated), a monument which from its extreme elegance has attracted many an artist to its remote position. Not only did it cause the continuators of Stuart and Revett's "Antiquities of Athens" to make a long *détour* to include it in their work, but it forms the subject of some of the best plates in Alison's monograph of Pola. Many of the plates in Joseph Lavallée's "Voyage pittoresque de l'Istrie et Dalmatie" are also devoted to its illustration, while there are several other foreign descriptions. There is a central arch with moulded architrave, no keystone. The pilasters supporting the arch are carved all over their surface with elegant foliage. Two fluted Corinthian columns stand on either side of the arch, the entablature breaking around them. The frieze is enriched over the columns, but plain in the centre part of the inscription. There is a well-developed attic already alluded to, projecting equally over the columns and with a central projection over the centre of the arch, there being portions of inscriptions on the piers, &c. The soffit is covered with diamond panels and decoration. The names of Sergius Lepidus and of other members of the same family occur, and there is evidence that this arch was a tribute of affection by a wife to her husband's memory. The town side of the arch is free of buildings, but the opposite one is encased within the more modern walls of enclosure, and it now forms one of the entrances to the town. It is known by the name of the Golden Gate, a title equally given to the Roman gate of the Palace of Spalatro, to the old gate in the town walls of Frejus in the south of France, and some others.

* See pp. 333, 371, 408, *ante*.

* Mr. Graham's plate elucidates this peculiar feature. The enclosure contained a sculptured figure, and was surmounted by a square cornice.

* It will be remembered that two exceedingly interesting papers on "Remains of the Roman Occupation of North Africa" have been read within the last two years by Mr. Alexander Graham, before the Royal Institute of British Architects. (See "Transactions" of the Institute; and the *Builder*, vol. xlviii., p. 741, and vol. l., p. 741). The fine arch at Timegad is shown in the Institute's "Transactions," vol. i., new series, as at present and as restored. It has a central arch and two side arches. There are square panels for statuary above the latter, and the main cornice, which was horizontal above the main arch, has curved pediments over the panels, a design not previously noticed in any of the arches referred to by us.

In the neighbouring town of Zara is a little-known triumphal arch removed from the ruined city of Nona and rebuilt to form one of the town gates, being known as that of St. Grinjona. The inscription states that it was erected by Melia Anniana to the memory of her husband, Læpicius Bassus, originally in some public place or market, the word "emporium" occurring in the inscription. It consists of a central opening, spanned by a semicircular arch with a moulded architrave, no keystone, flanked by a plain Corinthian pilaster on each side. The entablature is well proportioned, of excellent workmanship, the inscription occupying the whole of the frieze in two lines.

No attempt at restoration has been made, and only the upper portion of the arch has been rebuilt, the result being that the pilasters project bodily at the line of the springing of the arch, and do not go down to the ground.

The eastern provinces of the Roman Empire do not appear, judging by what we know at present from existing remains, to have had a great many arches of the description under review. There is a good arch at Salonica, but the remains of the old cities of Asia Minor, and many other districts, are so little explored and so covered over with earth, that it is impossible to say what discoveries may not be made eventually. There is a gateway at Ephesus which probably was a triumphal arch, although forming a part of the entrance walls. The arches of Palmyra do not call for reference here, since their description would have to be a portion of that of their magnificent colonnades. In the rock-hewn city of Petra is an arch of moderate size, of Roman date, built up and not excavated. It is greatly ruined, but sufficient remains to show that it consisted of a central semicircular archway, flanked by pilasters, having the peculiarity of their faces being divided into square panels of small size, and filled in with carving.

One of the most remarkable arches existing is the well-known arch of Hadrian or of Theseus at Athens (illustrated), and with the notice of this monument we will close.

A semicircular arch, springing from a large capital to the pilasters supporting it occupies the central position. There is a mass of walling, each block being neatly channelled left and right, terminating in large solid pilasters formed of large stones. No cement or mortar is used, the stones being laid dry. The thickness not being great, the pilaster extends from front to back, there being a large capital and a bold entablature, the latter broken around the pilasters. There were Corinthian columns left and right of the arch, but they have disappeared. The peculiarity of the design is the unique upper stage. This consists of a pedimented window opening, so to speak, supported by fluted Corinthian columns. Right and left of this is another square opening, of less thickness, the entablature forming its top being supported on slender panelled pilasters. The composition at present ends with these, the width of the upper stage being much less than the lower one. The whole is of Pentelic marble. It seems to be a remarkable circumstance that so many revolutions should have occurred, and that more than eighteen centuries should have passed away leaving this fragile monument still standing.

LINCOLN'S INN-FIELDS: THE STORY OF A WALL.

THE recent destruction of two very old houses, together with the partial demolition of another, their next adjoining neighbour, in Great Turnstile, High Holborn, reminds us that an important chapter still remains to be written in the history of London. The circumstances indeed of their original erection are so little known that a brief sketch may be appositely given of the less familiar facts that concern their site and its surroundings. Standing at the bay window on the second floor of Sir John Soane's house, in Lincoln's Inn-fields, a prospect opens before us which, for the measure of diversity of its architectural and historical interest, is quite unsurpassed by that of any other area, of equal extent, in all the town. Immediately below we see the handiwork of Inigo Jones, of Winde, of Kent, and of Barry. On the left arise Jones's one achievement in the Gothic mood, environed by nobler buildings due to Taylor, Hardwick, and Scott. Members of the Inn are drilling on the very spot wherein their predecessors had been repeatedly forbidden under strictest penalty to bear their bows bent, or to hunt the rabbits with dart or arrow,—the Coneygarth or garden which in the twelfth century William Cotterell gave to St. Giles's Hospital in frankalmoign, and which a hundred years later was held of St. Giles's by the Hospitallers of St. John of Jerusalem. Others play at lawn-tennis in an enclosure,—no longer a jockey's training ground, and more jealously preserved than when Gay wrote his "Trivia,"—over which Sadler had gasconaded with the purse and Great Seal he had stolen from the Lord Chancellor Finch's house in Great Queen-street; where Babington was executed; and William Viscount Russell triumphed, as Burnet tells us, over death. The history of nearly four hundred years could be filled into the space that lies between the angle towers of Sir Thomas Lovell's gate-house of Lincoln's-Inn and the *flèche* of Street's great hall at the Courts of Justice. Regarding, then, the wide interval between Stone Buildings and Ancaster House, we may not unreasonably ask how did it come about that we have an uninterrupted view of the varied buildings which go to form Lincoln's-Inn? Why has the fourth or eastern side of the Fields never been completed?

In the month of September, 1613, the County Justices received a letter from the Lords of the Privy Council for restraining certain proposed buildings in Lincoln's Inn-fields. The letter appears to have originated in an alarm taken by the students at "an intent to convert the whole field into new buildings, contrary to his Majesty's Proclamation, and all other public orders taken in that behalf, and to the great pestering and annoyance of the Society."* The interposition succeeded; for in respect of a specific encroachment contemplated by "a man of speciall quality, and much regarded by us all," we find them in October following writing to their good Lordships:—"It may please your Lordships to be advertised that in our absence this long vacation, upon attempt of buildings by the said Sir ****, the whole Socyety, both of the barre and under (then in town), made humble petition to your Lordships .... for the restraynte thereof, whereupon it pleased your Lordships to give strickt order for restraynte thereof accordingly." But not more than five years have passed when a special commission is directed to Lord Verulam, Inigo Jones, "et aliis, pro supervisione camporum vocatorum Lincolnes Inn Feilds." The Commission sets forth the king's no small contentment that within these sixteen years of his reign more public works near and about his City of London have been undertaken and finished than in ages heretofore. Then reference is made to the Fields as being situate in a place much planted round about with dwellings and lodgings of noblemen and gentlemen of quality, as well as of the Inns of Court or others, which if they were reduced into fair and goodly walks, would be a matter of great ornament to the City, pleasure and freshness for the health and recreation of the inhabitants thereabouts, and for the sight and delight of ambassadors and strangers coming to our Court and City, and a memorable work of our time to all posterity. These, though, are deformed by sundry cottages and mean buildings, with other encroachments and nuisances. It goes on to authorise the Commissioners,—the Earls of Worcester, Arundel, and Pembroke amongst them,—to frame and reduce the Fields, both for sweetness, uniformity, and comeliness, into such walks, partitions, or other plots, and in such fashion, both for public health and pleasure, as Inigo Jones shall, with the sovereign's approval, design. Thus empowered, that architect begins along the western side, for long afterwards known as West or Arch Row, and from its southern corner,—close to a traditionary relic of the Duchess of Portsmouth's dairy-house, the *soi-disant* Old Curiosity Shop.† There, just southwards of Portsmouth-place, and screened by the covered entrance into Lincoln's Inn-fields Chambers, may to this day be found one of his houses in its pristine state, marked with the Rose and Lily Queen's devices, and undefaced by the all-obliterating stucco of a later age. One of the earliest views of Arch-row is on the reverse of a silver medal, by G. Bower, struck to commemorate the destruction, 1688, of the Roman Catholic chapels in London. The Sardinian chapel (Duke-street) was sacked on December 10th, 1688. Lindsey or Ancaster House, Nos. 59–60, plastered over, and its younger neighbour, Nos. 57–58, are, be it noted, of stone.

In the first year of Elizabeth's reign the clay embankment that separated the Inn precincts from the Fields was ordered to be replaced with one of brick, having gates therein; the walk beneath the trees in Coneygarth had been laid out in the preceding reign. It is important to state that at this time the ground which is covered by the now square consisted of two fields, respectively termed Purse-field and Cop, or Cup, Field. Purse-field lay to the west; Cop-field eastwards, abutting against the wall. These were probably separated by the pathway that passed from Great Turnstile to Duke (now Sardinia) street. The open ground beyond, stretching to the Via de Aldwych (since Drury-lane) and St. Giles's pound, at the top of Elde-street (Crown-street), clearly appears in Aggas's view, which is believed to have been surveyed *circa* 1560. In 1639 the Society are again in arms; one William Newton being the offender. They present petitions to the king and the queen, praying that notice be taken of Newton's project to erect a great building in the Fields, and that he be commanded not to proceed any further in the said attempt, there being as yet no foundation of any building by him laid. They urge how they would thus lose the fresh and open air which they then enjoy on that (the western) side of their house; that sundry inconveniences would inevitably arise especially in times of infection, to the great discouragement of the petitioners, disquieting of their study, and disheartening of others to be hereafter admitted into their Society. The consideration of Newton's case is referred to Sir John Finch, Chief Justice of the Common Pleas. In 1641 the House of Commons order, upon the benchers' petition, stay to be made of any further building in Lincoln's Inn-fields; and in 1642 a Committee of the House is appointed to certify to the Bench upon a counter petition by Newton. Failing in his suit, he ultimately has to content himself with building operations at the north-western angle of the Fields, namely, the modern Gate-street, towards Little Turnstile. This was originally Newton's-buildings; westwards is still a Newton-street, leading from High Holborn, Nos. 206–7, to Charles and Parker streets. A petition is addressed to Parliament, 1656, by ratepayers of the parishes lying round about the Fields, complaining of the untoward state thereof. Their condition, together with the character of their frequenters (whose evil repute would seem to have been revived of late), formed a frequent topic for raillery and animadversion with our dramatists and other writers. Rufflers and Mumpers (or shamming cripples), ever ready to enforce charity with free use of their crutches; footpads, bowlers, wrestlers, horse-copers, beggars, gamins,—all contributed to confer notoriety upon a district which the orderly and better-disposed found it profit to shun. The petitioners' remonstrance extended to the Fyckett's, Purse, and Cup fields. One remedy suggested itself,—to resume the plan projected by Inigo Jones. Thus in the next year we find those persons who had interest in the Cup-fields inheritance agreeing to construct a continuance of the range of southern buildings (Portugal-row) eastwards, towards Lincoln's Inn Wall; and to make another range (Holborn-row), along the northern side, from the then newly-erected Newton's-buildings (Gate-street) to the present Newman's-row, at the end of Great Turnstile and Garden-place. The Society were favourable to the scheme, provided that the central space was left open and duly laid out, and no interference made with their easement of the wall. Thereupon covenants were entered into for erecting the two ranges of buildings in commensurate proportions as to "front, height, breadth, and beauty with the Row called Portugal-row, or in a more firm and beautiful manner"; and for the levelling, planing, and planting of the inner space, &c. It was further stipulated that "for the future no buildings other than the said two ranges should be erected upon the said field." Moreover, the inheritors covenanted to set up in the middle of Lincoln's Inn wall, a large pair of gates, and stairs of free-stone, having a fair and easy descent out of the Society's walks into the said field for the use and convenience of the students. They also convey to the Benchers the residue of Cup Field, upon trust, nevertheless that the Benchers should for their part execute to them

* See Dugdale's "Origines Juridicales."
† *Vide* the *Builder*, January, 1884.

a lease for 900 years under a small yearly rent, but with a covenant against the constructing any new buildings. In 1674 the Lincoln's Inn wall is raised, the garden enlarged, and beautified with the terrace walk along the wall. The "large pair of gates and stairs of free-stone" are now represented, we take it, by the private wicket immediately north of Hardwick's Library and Hall (1843–5), but the steps have disappeared, for the entrance is level with the road and garden within. According to the volume "New Remarks of London, &c., collected by the Company of Parish Clerks:" 1732, "the terras-walk in Lincoln's-Inn-Gardens, and the chambers at the north end of Searl-square (New-square) in that Inn," stand within the bounds of St. Giles-in-the-Fields parish. On the front and back of No. 11 of these chambers are fixed the two boundary marks of that parish and of St. Clement Danes. Nearly all of New-square,* — *antiquè* Lincoln's Inn Little Fields, or Fyckett's Field, is included in the latter parish.

In Speede's Survey of 1720, and in R. Wilkinson's Map of 1799, the whole of the northern side of the Lincoln's-Inn square is marked as Newman's-row, so named from its builder, *temp.* Charles II. This had been previously known as Holborn-row, *vide* the "New Remarks" cited above; whilst it would seem to have resumed, for a while, its earlier designation about the middle of the eighteenth century, since we find "Holbourn-row" in Baldwin's "New Complete Guide" of 1774–5, and elsewhere. Four iron posts by Garden-place render duty for the ancient turning-stile that passed foot-passengers from Newman's-row into High Holborn. That alley had formerly good renown for its milliners' and sempsters' shops. Cartwright, the actor, who gave a valuable collection of plays and pictures to Dulwich College, kept a shop here some two hundred years since, for the sale of Welsh flannels, friezes, and similar commodities, *teste* John Bagford, the well-known antiquary; and here Bagford himself started in business, but with no success on either venture, as shoemaker and then as bookseller.

Of the three houses to which we refer, No. 17 in the court, and No. 283, High Holborn, have been lately pulled down, whilst No. 16 (in the court) has been made more secure with new foundations and the removal of its second and third floors. The group claimed to form part of the Whetstone Manor, or Park, House, and in age, at least, confirmed this tradition. The walls were bulged and hollowed, the floors much out of level, and the side beams more or less out of truth. In one window of No. 16 remains of the original wooden mullions were discovered. The house had at one time a return front southwards. Mr. C. F. Hayward, F.S.A., the District Surveyor, took a scale drawing of one of the two wooden chimney-pieces,—5 ft. by 7 ft. 6 in.,—carved in early Jacobean style, and of good workmanship. We read in Cunningham that one William Whetstone was a vestryman of St. Giles-in-the-Fields, in the times of King Charles I. and the Protectorate. His name survives in a thoroughfare between High Holborn and the Fields whose infamous annals are familiar to us in the works of Butler, Shadwell, Dryden, and Lee.

* Serle-court, *alias* New-square, was completed about 1690.

NOTES AND SKETCHES IN "ST. MARY OVERIE," SOUTHWARK.

STOW in his Survey, speaking of the priory church of St. Mary Overie, now St. Saviour, says, "East from the Bishop of Winchester's house, directly over against it, standeth a fair church called *St. Mary over the Rie*, or *Overy*, that is, *over the water*. This church, or some other in place thereof, was (of old time long before the Conquest) an house of Sisters founded by a maiden named *Mary*. Unto the which house and Sisters she left (as was left her by her parents) the oversight and profits of a cross ferry or traverse ferry over the Thames; there kept before any bridge was built. This house of Sisters was after, by *Swithin*, a noble lady, converted into a college of priests, who in place of the ferry, builded a bridge of timber and from time to time kept the same in good reparations. But lastly the same bridge was builded of stone, and then in the year 1106 was this church again founded for Canons Regular."

Stow, in speaking of London Bridge, again refers to the priory of St. Mary Overie, stating that it was originally built out of the profits arising from the ferry, and that the priests built a timber bridge there, which was burned in 1136, but was repaired and newly made of timber in 1163. However that may be, the bridge of stone that stood till the building of the present structure was begun about the year 1176, and was some thirty-three years in building. How well it was built was practically tested by those who had the pulling of it to pieces.

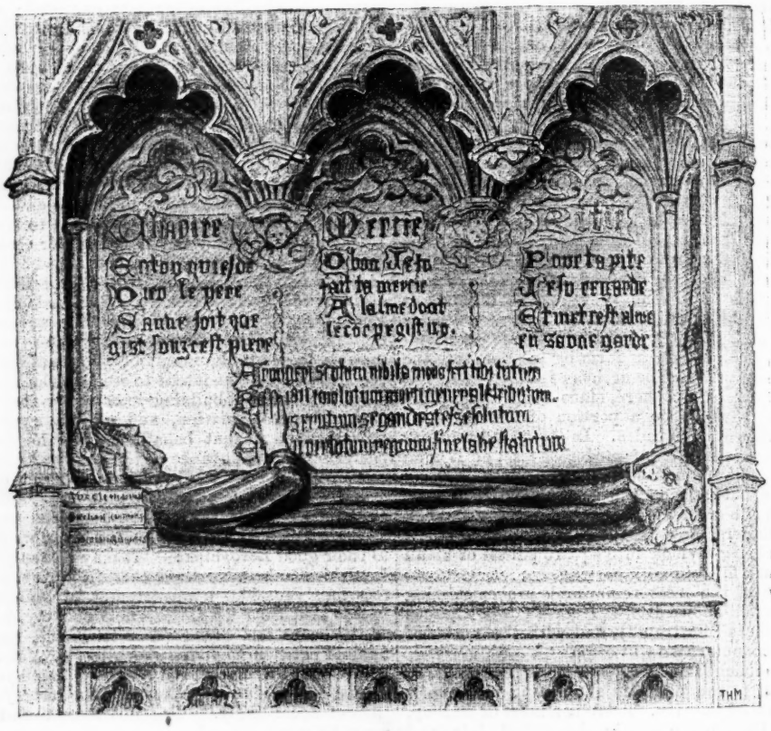


Fig. 1.—*Tomb of Gower.*

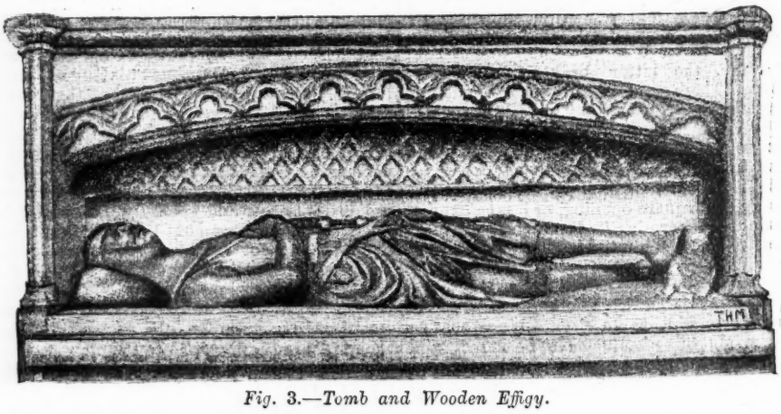


Fig. 3.—*Tomb and Wooden Effigy.*

Fig. 4.—*Monument to Bishop Andrewes.*

That the church was linked to the fortunes of the bridge or ferry there is little doubt, though in Dugdale's "Monasticon" the story which Stow gave on the authority of Linshed, the last prior, is denied. The priory was burned about the year 1207 (it is given 1213 in Dugdale, when the larger part of Southwark was consumed). "The Priory was rebuilt not many years after by the munificence of Peter de Rupibus, bishop of Winchester, so made in 1205, who also erected a spacious chapel, dedicated to St. Mary Magdalene, which afterwards became the parish church of that name and was subsequently made the south aisle of the priory church, as it now is. In 1273 Walter, archbishop of York, granted thirty days' indulgence to all who should contribute to the fabric of the church. This house was again burned, or, at least, much damaged by fire in the reign of Richard II., and was rebuilt in that of the succeeding reign, when Gower, the poet, is stated to have been a large benefactor." This is the account given in Dugdale, and Stow is not content with merely giving the name of Gower as a benefactor, but goes on to say:—"John Gower, a learned gentleman and famous poet (but no knight as some have mistaken it), was then an especial benefactor to that work, and was there buried on the north side of the said church, in the chapel of St. John, where he founded a chantry. He lieth under a tomb of stone, with his image also of stone being over him. The hair of his head auburne, long to his shoulders, but curling up, and a small forked beard, and on his head a chaplet, like a coronet of four roses, an habit of purple, damasked,

down to his feet, a collar of esses of gold about his neck, under his head the likeness of three books, the first named 'Speculum Meditantis,' written in French; the second 'Vox Clamantis,' penned in Latine; the third, 'Confessio Amantis,' written in English, and this last is printed. 'Vox Clamantis' with his 'Cronica Tripartita' and others, both in Latine and French, never printed, I have and doe possess, but 'Speculum Meditantis' I never saw, though heard thereof to be in Kent. Beside on the wall where he lyeth there were painted three virgins crowned, one of the which was named *Charitie*, holding the device:—

'En toy qui es Fitz de Dieu le Père,
Savue soit, qui gist sours ces Pierre.'

The second writing, *Mercie*, with this device:—

'O bone Jesu, fait tu mercy
A l'ame, dont le corps gist ici.'

The third writing, *Pitie*, with this device,—

'Pour ta pite, Jesu, regar'de,
Et met cest a me en savue garde.'

His armes, in a Field argent, on a chevron azure, three leopards' heads gold, the tongues gules, two angels supporters; on the crest a Talbot."

The tomb was done up and the legends repainted not many years since, but the angels are no longer visible, the devices being merely written at the back of the tomb as shown in the illustration (fig. 1). The tomb is interesting not only because it commemorates one of England's worthies, but also for its intrinsic art value. There is an archaic simplicity about the figure which is more suitable to the purpose and situation than the monumental effigies of three centuries later, a good example of which can be seen in the north transept. The chantry in which he was originally buried has long since disappeared and his tomb is now in the east side of the south transept.

Strype, who edited Stow's Survey, adds this very significant note:—"This is now a very magnificent church since the late reparation. It hath an huge organ, which was procured by voluntary subscription. The repair (it is said) cost the parish 2,600*l.* and that well laid out. The old monuments are all refreshed and new painted; a great deal of wainscoting. The workmanship of the arches and columns (which are very big) bespeak it a very ancient structure." He further says that a tablet hanging up by the pulpit recorded that "The church was laid throughout with stone, new paved and galleried; the great vault sunk, the pulpit and altar-piece erected, the communion-table railed and set with black and white marble, the choir enclosed by gates, the south and west windows opened and enlarged, the whole new glazed, the sixth and seventh bells cast, the chapel paved, and all the church cleansed and beautified at the charge of the parish, anno 1703."

We will at one step come from 1703 to 1830, when the church was described by Ellis and Bandinel, in their edition of the "Monasticon." "The present Church of St. Mary Overey is a fine specimen of what is called Gothic architecture" (the peculiar vagueness in the use of the word Gothic is striking), "the whole building being in length 272 ft.; the breadth, including the two aisles, 61 ft.; the north transept 29 ft., and the south 31 ft. in length, built in the cross-form, like a cathedral, having a central tower resting on four columns. In spite of the two fires in the thirteenth century, it still presents some remains of its earliest structure, though the greater part was rebuilt in the reigns of Richard II. and Henry IV. The key-stones of the building are ornamented with the arms of the priory and other devices, amongst which are seen phœnixes rising from flames, evidently alluding to the restoration of the church after fire. The tower is 35 ft. square and 150 ft. in height. The roof of the nave is supported by twenty-six pillars, thirteen on each side. The Lady-chapel at the east end is 42 ft. in length, now used as the Bishop's Court; the visitations for the deanery of Southwark are also held in it. The front of the west end of the church has a range of small pillars forming niches. Before the late repair of this fabric began in 1818, under the care of Gwilt, a century had nearly passed away without anything worthy of notice having been done for its preservation. It would appear from the date upon the nave that in 1734 some considerable changes were effected upon the exterior of the structure. The embattled parapets shown in Hollar's engraving of the church were then removed, and the external stonework cased over with brick. About the same time the northern front of the north transept was taken down, and a substitute of timber framing and geometrical tiles as an enclosure to two of the bays, which were left standing, were put up in its stead. The south transept was respited till the next year, when the same operation was performed as upon the nave; the rose-window was demolished; and the moulded tracery of the side windows, and the painted glass of knights in armour, of which a drawing is preserved among Nicholas Charles's collections in the Lansdowne MSS., removed. The tower had been substantially repaired and the pinnacles rebuilt in 1689. In 1818 the tower was again repaired, and the whole exterior encirled with cast-iron bars or ties, in three stages, so concealed as not to be distinguishable from the masonry. In 1822 and 1823 the choir was repaired and a very considerable portion rebuilt; the chapel of St. Mary Magdalene, on the south side of the choir, taken down; the side windows of the aisles restored with new masonry; and the windows throughout filled with cast-iron lights instead of leadwork; in all which works the architect judiciously adhered not only to the ancient general design, but to the minutest detail, wherever it could be made out, fragments of moulding worked up in the masonry of the old building having in some instances served as models. The exterior of the choir having gone to entire decay on account of the softness of the stone which had been used, was rebuilt from a new design. The repair of the tower of the church cost 5,200*l.*, that of the choir nearly 12,000*l.* The transept and the bishop's court are still to be repaired."

Not all the troubles, however, that befel this priory church can compare with the act of vandalism that it was left this century to perpetrate. The whole of the nave west of the tower was taken down in 1838, and in its place was built the present structure (used as the parish church), than which nothing can be more architecturally contemptible, and yet one of the conditions of the rebuilding was, "The whole plan must combine a suitable Gothic building at a moderate expense, and be externally in unison with the works already done at the east end, or as near as possible." What we lost by the destruction of the nave may be seen from Coney's engraving of the church as it appeared in 1819. As the church now exists the new portion is several feet above the level of the old nave, and is entirely shut off by a wall and window, so that the fine uninterrupted view from east to west is no longer to be obtained. Many of the carved bosses from the roof, which was (we regret to say) a timber vaulting, are still to be seen piled up in two doorways that originally led from the choir to the Lady-chapel, two of which are given here (fig. 2). With the exception of George Gwilt, who so conscientiously and carefully restored the choir and Lady-chapel (the work seems to have been throughout a labour of love), from 1822 to 1832, all who had anything to do with the church gave a helping hand to alter and deface it.

1106 may be taken as an approximate date of the refounding of the church, Bishop Giffard building the nave. The priory seems to have been burned in 1207. Peter de Rupibus (de la

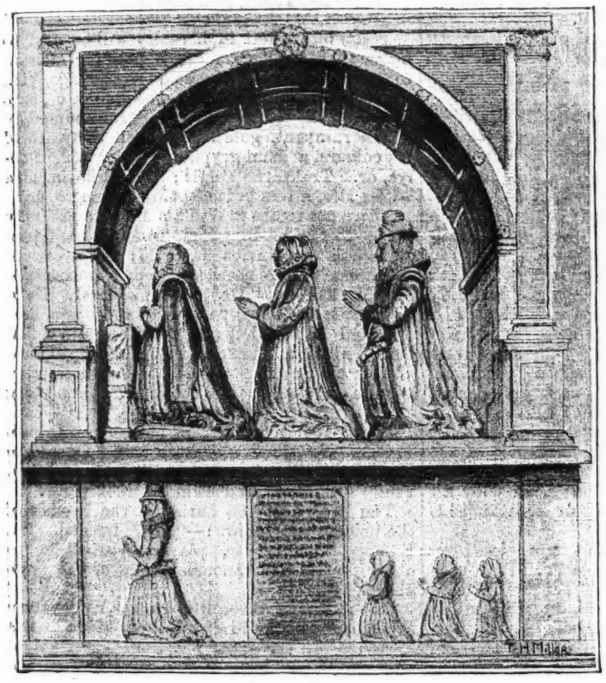


Fig. 5.—Tomb of Richard Humble.

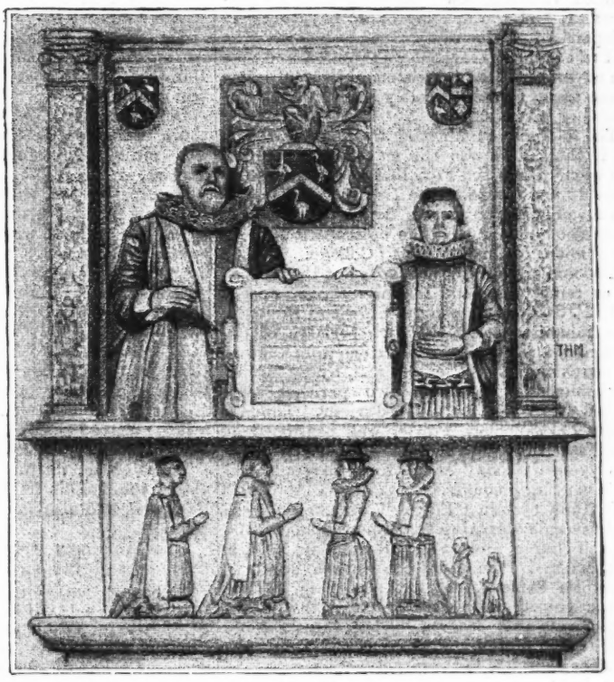


Fig. 6.—Tomb of John Trehearne.

Fig. 2.—Bosses from Old Roof.

Roche), Bishop of Winchester, built the chapel of St. Mary Magdalene on the south side of the choir. This was destroyed in 1822. The nave was probably reconstructed by the same prelate. The choir, choir aisles, and retro-choir were somewhat later in date. On the 15th February, 1260, Henry de Wengham, Bishop of London, was consecrated by Boniface, Archbishop of Canterbury, in this church, which shows that a sufficient portion of the structure was then completed to allow of its being used for such a purpose.

The building was in progress in 1273, when much still remained unfinished, including the whole of both transepts, Walter Giffard, Archbishop of York, granting thirty days' indulgence to those who assisted towards its completion.

The church was still far from finished at the beginning of the fourteenth century, the upper part of the tower not being built much higher than the open gallery above the four large arches till long after that date. The north transept was built first, but the architecture of the south transept belongs to the reign of Edward III.

A fire damaged the church in Richard II.'s reign, and it was towards the reparation caused by this fire that Gower the poet was so great a benefactor.

The next casualty that befel the church was the fall of the roof of the nave in 1469. The roof was shortly afterwards rebuilt in oak, and consisted (as before mentioned) of imitation groined vaulting, lower in pitch than its predecessor, and the spacing of its bays entirely independent of the compartments below. The roof of the north transept was similar, and, like the nave, continued in existence till 1830. The south transept was possibly the same, but no record of it exists.

The final and culminating work of decorative art in the church was the magnificent reredos, the work of Richard Fox, Bishop of Winchester from 1520 to 1528. The two upper stages of the tower, viz., the ringers' floor and the belfry, were also added during the episcopate of Fox, the founder of Corpus Christi College.

The annual value of the priory at the time of its surrender was 656*l.* 10s., according to Speed, or 624*l.* 6s. 6d. according to Stow and Dugdale. The inhabitants of the two parishes of St. Margaret and St. Mary Magdalene were allowed to purchase the structure, and, by an Act of Parliament in 1540, the two parishes were united under the title of St. Saviour. The last prior, Bartholomew Fowle, was pensioned at the rate of 100*l.* a year, and eleven other "relygeuse p'sons" were likewise pensioned with varying amounts.

In 1559 certain "Popish" ornaments were sold towards defraying the expenses of repairing the church, and on the 31st of May, 1561, it was ordered "That all the church books in Latin be defaced and cut according to the injunctions of the bishop"; and in the following June it was ordered "That the rood-loft be taken down and made decent and comely, as in other churches in the city."

In 1689 the pinnacles of the towers were altered from their original design, and new vanes were set up. Other alterations were made, if we compare Hollar's views (1647 and 1661) of the church with the fabric itself.

In 1703 a Corinthian altar-screen, said to have been designed by Wren, with blazing fire-pots and volant cherubim, was put up so as to almost entirely hide the work of Bishop Fox. This was taken down and the reredos restored in 1833.

In 1830, when the approaches to new London Bridge were in progress of formation, the Bishop's chapel, which stood at the extreme east end of the church, abutting on to the retro-choir or Lady-chapel, was destroyed. The tomb of Bishop Andrewes was removed to its present position on the west side of the Lady-chapel. This chapel, the original Lady-chapel, was of fourteenth-century character; its length was 34 ft. The present Lady-chapel was only saved from a like destruction by the tardy interest of the parishioners, 380 voting against its destructing and 140 for it.

Under the superintendence of Gwilt, who is buried in the Lady-chapel which he so lovingly restored, a large part of the clearstory and triforium were rebuilt in a most careful, accurate, and conscientious manner, the old work being preserved wherever practicable, and the detail of the new moulded and carved work, for which prototypes could be found, assimilating as nearly as possible to the old.

The transepts were restored in 1830, cement being used from motives of economy in the moulded detail of the interior instead of stone.

The old nave was finally destroyed in 1839, and there only remain the choir and Lady-chapel of the ancient fabric, and even much of this is overlaid or defaced by work of later times.

The reredos, as we have said, was much mutilated when the wooden altar-screen was set up, but was restored in 1834. The window above the reredos now existing is the one designed by Gwilt, the previous one, of the time of Henry VII., having been taken down in 1824.

The only authentic record of old glass existing in the church refers to a three-light window on the east side of the south transept, figured in the Lansdowne MSS. in the British Museum. The design consisted of three knights holding shields and weapons, with heraldic shields and other devices around the figures. No trace of old glass now exists. The modern glass, of which there are several examples, is in no way noteworthy. That there was a good deal of painted glass in the church at one time is evidenced by the bill for repairing, re-leading, and re-painting broken pieces, which dates from 1605.

The altar-table is of oak, and is not a bad example of seventeenth-century work. It was the gift of Dame Joyce Clerke.

There is also standing in the choir a curious inlaid oak chest, intended for parish records, the gift of Hugh Offley, Alderman of London, and Mayor in 1556, and of Robert Harding, whose daughter Hugh married.

The elaborate wrought-iron chandelier, with its brass candle-holders, was given by Mrs. Dorothy Applebee at the end of the seventeenth century.

Besides the tomb of Gower already described there are several others that claim attention. The most interesting, as well as the most ancient, is the oaken effigy of a knight lying down cross-legged, with an animal at his feet. It is now painted a dull stone colour, and is a really fine piece of work, the face being particularly well carved. "The figure is attired in a complete suit of chain armour, being a hauberk with sleeves, capuchin, and chaussé. The body is covered with a surcoat, which is crossed by two belts,—the one round the waist for sustaining the sword, the other across the body from the right to the left side to sustain the shield, which is now destroyed, although a fragment still exists on the arm. The head rests on a lozenge-shaped cushion. The legs are crossed, and rest on a mutilated lion. The hilt of the sword is broken off, but the position of the arms shows the knight held the scabbard with his left hand, and was in the act of sheathing his sword."

Since this was written the figure has been restored and the sword replaced. It is conjectured to represent one of the De Warren family, and dates about the reign of Edward II. A drawing of this figure is given (fig. 3). The canopy above it is not necessarily the one designed originally for this figure, as for a long time the figure was treated as mere lumber and allowed to be about the church where it could.

There is a *memento mori* effigy in the north transept, probably taken from the lower portion of the tombs of one of the priors, where such figures are usually to be seen. It is much mutilated.

The tomb of Lancelot Andrewes, bishop of Winchester, born 1555, died 1626, a drawing of which is given (fig. 4), is now in the Lady-chapel. It represents a man in middle life, attired in a surplice with ample sleeves, and covered with a rich cope, on the left shoulder of which are engraved the cross of St. George and the Garter, with the motto of the order "Honi soit qui mal y pense," of which order the Bishop of Winchester is the prelate. The head is covered with a small scholastic cap. The figure is painted, as are most of the other monuments in the church. The following is the inscription on the tablet:—

"Sept. 21. Die lunæ, Hora matutina fere quarta,
Lancelotus Andrewes episcopus Wintoniensis,
Meritissimum Lumen orbis Christiani,
Mortuus est.
(Ephemeris Laudiana.)
Anno Dom. 1626. Ætat. suæ 71."

Above are the arms of the See, impaled with argent on a bend, engrailed cothised sable, three mullets, or.

Stow says: "The monument of Bishop Andrewes is in a chapel at the east end of the church, and his body lieth within the monument. He here refers to the Lady or bishop's chapel, taken down in 1830." There were many more inscriptions on his tomb when Stow wrote, as he enumerates them in full.

The tomb of Richard Humble, a drawing of which is also given (fig. 5), occupies the eastern-most arch in the north side of the choir. Before an altar are kneeling the alderman in his civic gown, and his two wives in the costume of the reign of James I. The arched canopy has of late years been painted to imitate marbles. The following well-known lines are on the dado of the altar tomb:—

"Like as the damask rose you see,
Or like the blossom on the tree,
Or like the dainty flower of May,
Or like the morning of the day,
Or like the sun, or like the shade,
Or like the gourd which Jonah had,
Even so is man, whose thread is spun,
Drawn out and cut, and so is done;
The rose withers, the blossom blasteth,
The flower fades, the morning hasteth,
The sun sets, the shadow flies,
The gourd consumes, and man he dies."

The figures are all painted in colours. The tomb to John Trehearne, gentleman porter to King James I. and his wife is also illustrated here (fig. 6). The monument is against the north wall of the north aisle, and consists of two half-length figures divided by a tablet bearing the following quaint inscription:—

"Had kings a power to lend their subjects breath,
Treherne, thou shouldst not be cast down by death.
Thy royal master still would keep thee then;
But length of days are beyond reach of men.
Nor wealth, nor strength, nor great men's love can ease
The wound death's arrows make for those past these.
In thy king's court, good place to thee is given,
Whence thou shalt go to the King's court in heaven."

Those interested in heraldry will be glad to know that the "arms are a punning allusion to the name, characteristic of the age, viz., azure, a chevron between three herons, or, on a canton of the second, three bars surmounted by a lion rampant, gules. Crest on a wreath of his colours, a demi-gryphon holding a fleur-de-lys, or. Trehearne single; Trehearne impaled with gules, a fess between three lozenges, or."

There are tombs to William Austin and family 1633, to John Bingham, saddler to Queen Elizabeth and James I., 1625; and a curious monument in the north transept to a once celebrated pill-man, "Dr." Lionel Lockyer. He is represented as lying resting upon his arm, life-size, and in the dress of the time with a full curled wig and a strange uncomfortable expression on his face, the repose of death so characteristic of earlier funeral monuments being entirely absent.

What will attract the attention of most visitors are three stones in the floor of the choir cut with the names of John Fletcher, Philip Massinger, and Edmond Shakespear.

The record of the burial of the brother of the poet is as follows:—"1607, December 31, Edmond Shakespear, player, buried in ye church, with a forenoone knelle of the great bell, 20s."

Of the first of three well-known names there is a memorandum in the Aubrey MSS. to this effect:—"In the great plague, 1625, a knight of Norfolk or Suffolk invited him into the country. He staid but to make himself a suit of cloaths, and, while it was making, fell sick of the plague and died. This I had from his tailor, who is now a very old man and clerk of St. Mary Overie's." The burial registries record his interment thus:—"1625. Auguste 29. Mr. John Fletcher, a poet, in the church." It is recorded by Langburne of Massinger, "that he went to bed in good health and was found dead in his own house on the Bankside, Southwark." The announcement of his name in the register is simply:—"1639. March 18. Philip Massinger, a stranger, in the church, 2*l.*, viz., the amount paid for his grave, knell, and funeral expenses. His fellow players paid a tribute to their departed friend by following him to the grave."

The bells, which were originally seven in number and were hung in the days of Prior Henry Werkeworth, 1424, were, in 1735, newly cast and made into a peal of twelve by Knight & Co., at a cost of 629*l.* 17s.

The "Builder" for Colonial and Foreign Postage.—Our foreign and colonial subscribers, as well as those at home who are in the habit of sending an occasional *Builder* to their friends abroad, will be interested to know that we shall in future print a portion of our issue, so far as the letter-press is concerned, on thinner paper, thus reducing the weight to something under eight ounces. For the illustrations we shall continue to use the same paper as at present.

THE SANITARY CONGRESS AT YORK.

INAUGURAL ADDRESS BY SIR T. SPENCER WELLS.

THE ninth Autumn Congress of the Sanitary Institute of Great Britain was formally commenced on Tuesday evening, when

The inaugural address was delivered by Sir T. Spencer Wells, Bart., F.R.C.S., President of the Congress. In the course of it he said:—

Any great sanitary improvement of the community must be the result of elaborate co-operation. We must have the combined action of the three great classes of investigators, legislators, and administrators, before we can effect any good result. And if we regard sanitary reform in these three aspects, we find that a great deal of the work of investigation has been done, and that the work of legislation is lamentably deficient; while the work of administration cannot advance beyond the limits of legislation.

As regards the work of investigation, we may safely assert that it has hitherto been for the most part personal, and that the waste of labour has been enormous. It is only of late that this Institute has come in aid. Three-fourths of the fifty years that Southwood Smith, Chadwick, Farr, and Trevelyan were at work, they were well-nigh single-handed. Perhaps the foundation of such a body as the Sanitary Institute may be enough for them to be proud of; but more must follow; and it is to be hoped that before long we shall have, for the sake of life and health, an organisation as powerful as that which protects our property and our liberties. The Institute must develope into something grander and more powerful. The Colleges of Physicians and Surgeons have done and are doing much useful work; but the work is done more for the individual than the collective good. Without interfering with them,—rather aiding them,—why should we not have a College of Health,—a College which would show our appreciation of the gift of life and our reverence for the Giver?

But, turning back for a moment, let us glance at what the advanced guards of sanitary science have already accomplished. It is bare justice to them from time to time to recount their services, and while we are encouraged by their success, we shall learn what remains for us to do. We have only to look carefully into the memorial volume of selections from the reports and writings of William Farr, published by the Council of this Institute at the suggestion of Dr. Gairdner, to find a revelation of the mass of ignorance, prejudice, and folly which our early reformers had to expose, and of the variety and extent of their labours. It is a record which is honourable to all, and to him whose writings it enshrines it may serve as a monument more eloquent and touching than any brass or marble. What did we know of vital statistics fifty years ago? It was in 1837 that our Registration Act came into operation, and certainly no one could have more ably worked it or turned it to better purpose than Farr. It was from his Reports that it first became generally known that our death-rate was too high. We now know that the measures indicated, and taken as necessary to lessen mortality, have been so effectual that a large part of the gain in twenty years in the average duration of life in this country since the beginning of this century may be claimed for the registration period; and there can be little doubt that, if the provisions of the Registration Act were more strictly enforced, the prolongation of life would be greater. Very few even of those well informed in sanitary matters are aware of the large proportion of the population now buried without the cause of death being properly certified. When Dr. Cameron introduced the Disposal of the Dead Regulation Bill in the House of Commons in 1884, he showed that in England and Wales more than 20,000 bodies in a single year were buried without any certificate whatever of the cause of death. In Ireland there were more than 4,000 burials under the same circumstances, while in Scotland in no fewer than 20 per cent. of the total number of deaths registered, the causes of death were uncertified. Even in Glasgow, not less than 9 per cent. of the total number of persons who died in that city in 1882 were buried without any certificate of the cause of death. Having learned the important results obtained by what we must confess to have been very imperfect registration, I desire in the strongest manner to urge attention to the necessity for more strict observance of the provisions of the Act by the public; and for more careful and accurate certificates from members of my own profession,—a profession ever ready freely to assist the State when asked for information on any question affecting the public health and welfare. . . . .

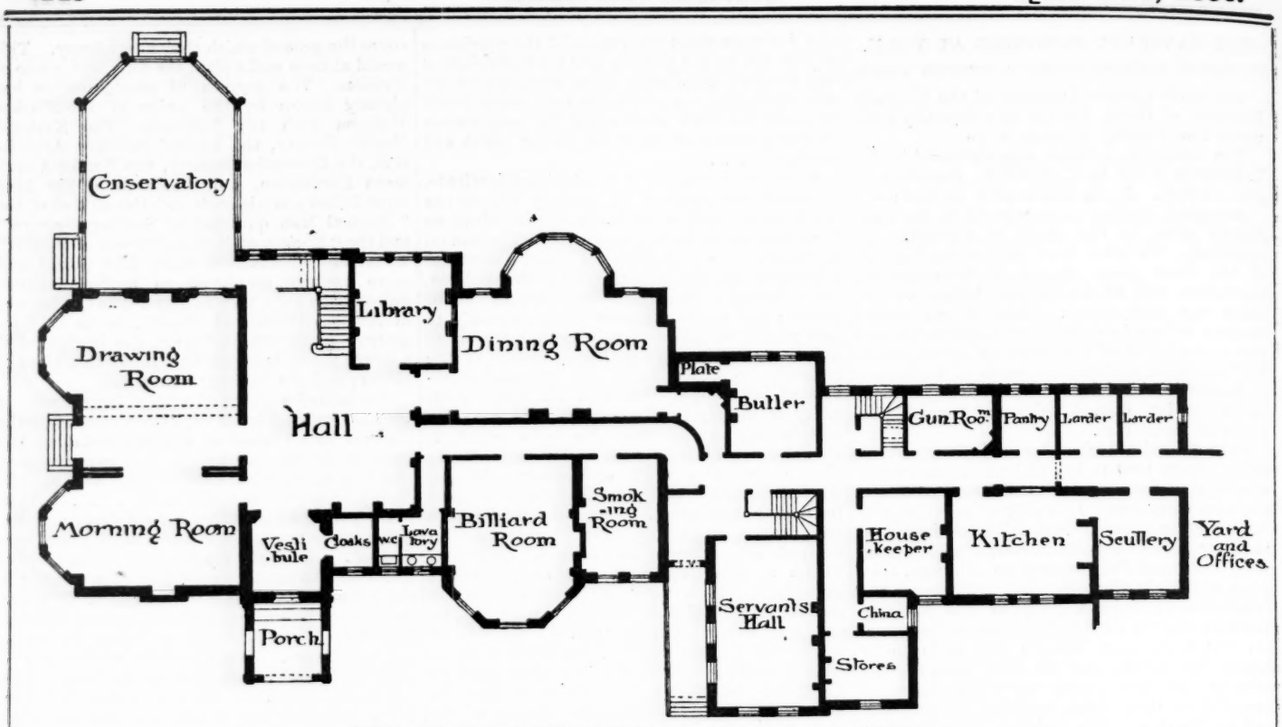
Since the formation of the Sanitary Institute, although the progress of sanitary science has not been as rapid as we desire, yet its advances have been more readily measured. The annual meetings, the presidential and sectional addresses, and the papers read in the sections, have brought important movements under notice; and as the congress migrates yearly to new places, its information becomes more varied and trustworthy. We gather assurance of the generally improved moral and physical condition of the people. We find that infant mortality is lower; that education becomes more satisfactory as the principles upon which it should be conducted are better understood; that those who work are better paid, get wholesomer food, and dwelling-places more fit for human habitation. Increasing intelligence has given a claim to political rights, and developed an interest in political questions. Thrift is more common, and savings banks more used. It is barely fifty years since the general introduction of savings banks; yet, by the last returns, more than 45 millions of money stand to the credit of depositors in these trustee banks; while in the Post Office Savings Bank, only established in 1861, more than 44 millions belong to the industrial classes of the United Kingdom. Thus a total of more than 90 millions now represents the results of the thrift of the people during the past half century. And co-operative associations show more and more, year after year, how well and quickly, when men begin to learn that life and health are worth looking after, they find out the means of taking care of themselves and of their material interests; and I think I am not going too far when I say that this Institute may be congratulated upon the success of what it has done tending to the recent diminution of drunkenness and crime.

With all this encouragement we may look hopefully to the future, and consider what are the most pressing subjects of inquiry, and which is the way of conducting our investigations that gives the greatest promise of success. The field is vast, but, as we have seen, it is not impenetrable; and obstacles are sure to yield to steady and well-directed attack. Facing the difficulties, what is our attitude? Our representative meeting here manifests that we are numerous; our Institute shows a certain amount of aggregated working power; but it is more a nucleus than a complete organisation. It may be effective as an investigating, deliberative, consulting, and examining body, but it has no directorial power, no agency for carrying out practically the measures which its collective wisdom has indicated. Crowds of sanitary volunteers hover about it, and make desultory attacks upon weak points, often with much waste of energy. "What we want is a central power," as Lord Brabazon wrote last month in the *Times* (August 30), "which shall regulate and control local action, so that no town or locality shall be able to neglect the public health, or, in endeavouring to purify itself, shall poison its neighbour. We want a power which shall take a bird's-eye view of the whole question, and work not for the good of one locality only, but for the good of all." This is what we want, and what we must have some day. But, while we are waiting, an interim organisation of deliberative and administrative agency should be set up, as if a Ministry of Health were in power. The Local Government Board, too, with all its official completeness, like ourselves, may recommend, but cannot command. There seems to be a link missing between the knowledge of what is right and the power to apply it. This link is a Minister of Health. We have now only the elements of the organisation which I suggest; its formation is matter for consultation and arrangement, and probably might be accomplished without much delay. In the meantime, what are *we* to do? The last generation has done so much with means less efficient than we have at command, that we ought to do more than emulate the past. This Institute, united with the Parkes Museum, is bound, in my opinion, to induce all the others to make not only common cause, but joint action; or, failing in this effort, it may, by increased activity, in a short time cover the ground which they now occupy. This would at once make plain the folly and waste of division. The process of amalgamation has already begun by the union of the Parkes Museum with our Institute. The National Health Society, the Ladies' Sanitary Association, the Cremation Society, the Smoke Abatement Institution, and others of a like kind must follow; while such societies as that of the "Medical Men qualified in Sanitary Science" and the "Society of Medical Officers of Health" would find themselves more fitly placed and more usefully employed as sections of one united body than they now are. The Conference of Medical Officers of Health, to be held to-morrow afternoon, is, I trust, the beginning of a closer union between this important class of officers and the Sanitary Institute.

The active working of such a large group of philanthropic societies shows how constantly the interest in all sorts of sanitary measures has been increasing during the last twenty years, and how much it has been in the power of such feebly-supported societies to do. . . . . Of the many things which affect our comfort and well-being, some are national, some local, some residential. One of the most potent means of influencing the sanitary condition of a country is the judicious regulation of its forests. In Great Britain the Government all but ignores the subject of forestry. There is no school for teaching the science. Every proprietor is obliged to shift for himself, or to seek foreign help. And yet by looking at the state of things in Upper India, Palestine, and Russia, we may see what mismanagement leads to. Almost everywhere, man's ignorance and recklessness has worked evil by destruction of the forests. He has deteriorated the condition of the climate, taken away the productiveness of the soil, brought on famine and pestilence. We are not suffering to this extent. But negligence and mischief are inseparable, and to urge measures for the preservation of any climatic advantages we may still have, and the restoration of those we have lost, is assuredly work pertaining to a Sanitary Institute. My friend, Dr. Lyons, when in the House of Commons, did good service in pressing the importance of tree-planting, especially in Ireland, upon the attention of the Government. Unfortunately, he is no longer a Member of Parliament; but he still continues his efforts to prove that by well-directed management the whole of the timber and forest products now obtained from abroad, at an annual cost of some 32 millions sterling, might in time be furnished by our own land and labour, and that this economy would be attended by no less desirable changes in some of our climatic conditions.

Even the best-regulated communities are encumbered with things which they must get rid of,—human refuse, human remains. The one can be dealt with as best suits public convenience, but the other must be treated with reverence as well as security. In our "Transactions" already published, and in the forthcoming papers and discussions, you will find as much as can be told of what has been done through our instrumentality, and of the happy results that have followed. And if I may judge from the titles of promised papers, with illustrious names appended to them, upon the various aspects of sewerage, draining, the supply of water, ventilation, the purification of town atmosphere, lighting by electricity, and the extended application of gas to domestic purposes, this Congress will rival any others in the importance of the subjects brought forward. As regards the question of the disposal of the dead, I may refer you to a lecture of mine, which has been placed in your hands, with remarks upon it by Sir Lyon Playfair, Dr. Cameron, Sir Joseph Fayrer, and Mr. Seymour Haden, with two of the last letters written by the best of the Shaftesburys. Public opinion has been veering round since the publication of the Charge of Sir James Stephen. A custom known to be not illegal will be adopted by many who have hitherto been deterred by the fear of illegality; and the society which alone in England gives facility for it, is ready to perfect its accommodation, or to give place to any administrative body upon a wider basis.

When we come to speak of the question of legislation, we, as sanitarians, find ourselves in the same plight as the rest of the world loaded with good intentions. The waste of time and energy in Parliament in party struggles has banished all possible home legislation. We must bide our time, assured that, when this crisis of angry discussion of political complica-



Holborough Court, Snodland, Kent.—Mr. Hubert Bensted, Architect.

tions has passed, the turn will come for practical measures. We shall then settle down to a calm consideration of what is really wanted, shall have our chance of being heard, and probably get a good deal of what we ask for. Our demands will appear so reasonable, our work so useful, and our plans so feasible, that no committee will have the heart to suppress them, no Parliament the churlishness to refuse them. Only let us be prepared for the occasion, have our subjects chosen, our evidence forthcoming, our arguments marshalled, and our advocates ready. We shall have ourselves to blame if we do not make sanitary legislation the popular legislation of some sessions near at hand.

In his address to the last annual meeting of the Institute Captain Galton remarked that, "if legislation is not to be ridiculous, it must be accompanied by increased knowledge in sanitary matters on the part both of the persons charged with administering the Sanitary Acts as well as of the public themselves." This is the key to the whole subject of sanitary legislation. The various classes of persons affected by sanitary measures, or concerned in carrying them out, show different degrees of sanitary knowledge, from the zero of ignorance on the part of the public, the confusion of local boards, the self-acquired information of district surveyors and inspectors of nuisances, the results, whatever they may be, of a course of hygienic medicine among the medical inspectors, up to the accumulated science of the Institute and its allies, and the acquired experience of the Local Government Board. The one fact that stands out clear above all others is that there is no definite channel by which these stores can be disseminated and employed for instruction. The course of lectures given by the Professors at the London Colleges and at Netley are only intended for the use of medical students. There is no available public means of instruction in matters relating to health for the large body of surveyors, sanitary inspectors, and others whose actual duties are connected with public health; and nowhere at the present time is any systematic instruction given in practical hygiene to the general public. In the report of our council for this year it is stated that "the number of candidates for the examinations still continues to show a very rapid increase"; but it was only this year that, for the first time, a special course of lectures was arranged by the Parkes Museum to suit the requirements of persons preparing for the examinations of the Institute and other bodies which grant certificates. These lectures were given by well-known authorities, and no fewer than sixty-three candidates entered for the course. This alone shows how fully justified Captain Galton was in making this further observation; that if the Sanitary Institute is to fulful its functions of diffusing knowledge in relation to sanitary science, "it must not be content with holding periodical examinations; it must develope its educational character still further, and it must afford opportunities for students to qualify themselves for these examinations by providing lectures on practical sanitation, and by furnishing laboratories for research in sanitary matters." As regards the public, it will no longer do to trust to the voluntary efforts of the National Health Society, zealous and worthy of all praise as they have been. Such work may be suspended at any moment, and, to be certain and effectual, must be undertaken by some public body in an orderly and persistent manner. The ear of the public can be easily reached by suitable addresses and house-to-house visitation; their curiosity excited and their minds enlightened by the objects exposed for examination and explanation in museums. The Parkes Collection will inevitably grow into great importance, and arrangements can be made to secure its utility. But though teaching power can never be wanting among our members the puzzling problem is how to bring it to bear directly upon the masses. This is a point upon which I confess myself unable to give a prompt opinion. As one for solution by our collective wisdom it stands second to none. Yet, when we have instructed the public and embodied our contingent of qualified agency, how are we to make sure that the agents shall act efficiently upon the public? It can never be done without elaborate organisation, and no organised body can act without full legislative authority, and then only under a responsible chief. If it be expedient to have a military medical staff and a naval medical staff, with their grades of officers and all-powerful directors-general, for the comparatively small bodies of the combatants, why should there not be for the much more numerous civil subjects a civil medical service, equally authorised and as honourably appointed? Such a service would form an important department of a Ministry of Health.

There is one matter which I must speak of before concluding, and that is the importance of our having the unsectarian assistance of all religious teachers. Sitting as we do here under the shadow of the hallowed Minster which is the crowning and significant glory of the ancient city of York, one cannot but recall to mind how for successive ages its ministers have been the benefactors of all who came within the sphere of their action. In times of ignorance they spread light around them. In times of distress they gave succour to the needy and shelter to the homeless. In times of sickness and pestilence they were ever ready, at their own risk and peril, to visit either castle or cottage, with consolation for the troubled mind and remedies for the tortured body. And now, in these later days they, and others allied with them in the same holy work, come among us laymen, trained up by them in the spirit of Christian charity, to second our attempts to work the good of the people, to instruct themselves in the principles of our science, and to add the benefit of their wisdom and experience to our efforts, with as much zeal and devotion as were ever displayed by any of the bygone generations of their revered predecessors.

With such objects in view, actuated by the same spirit of goodwill to mankind, and impelled forward by an equal energy, we may promise ourselves the attainment in due time of our desired end,—that of contributing to the real and stable greatness of our country, by giving to it a healthy and long-lived population; for we may rest assured that, in the words of Froude, 'A sound nation is a nation that is composed of sound human beings, healthy in body, strong of limb, true in word and deed,—brave, sober, temperate, chaste,—to whom morals are of more importance than wealth or knowledge,—where duty is first, and the rights of man are second,—where, in short, men grow up and live and work, having in them what our ancestors called 'the fear of God!'"

[Other proceedings of the Congress will be found on another page.]

Illustrations.

A TERRA-COTTA FRONT, 17, OXFORD STREET.

WE give this week a sheet of illustrations showing the business premises lately erected from the designs of Messrs. Batterbury & Huxley, architects, of John-street, Bedford-row. The illustration of the terra-cotta and rubbed brick front is a reproduction of the drawing lately exhibited at the Royal Academy.

The builder was Mr. M. Manley, of Regent's Park. The terra cotta was supplied by Messrs. Doulton; Mr. Pain, of Highgate-road, having modelled the enrichments.

HOLBOROUGH COURT, SNODLAND.

HOLBOROUGH COURT, an illustration of which we give this week from a drawing exhibited in the late Academy Exhibition, has been lately erected for Major W. H. Roberts, J.P., at Snodland, Kent. It is built of red brick, with dressings of red concrete and moulded bricks.

The interior of the house is fitted to a great extent with wainscot enriched with carving by Mr. McCulloch.

The work was carried out by Messrs. Pryer & Co., of Maidstone, at a cost of 30,000*l.*, from the designs of Mr. Hubert Bensted, F.R.I.B.A., of Maidstone.

C. F. Kell, Photo-Lith & Printer

THE TRIUMPHAL ARCH

ARCH AT POLA, CALLED THE "PORTA AU

RCHES OF THE ROMANS.

AUREA." *From an Engraving by Masquelier.*

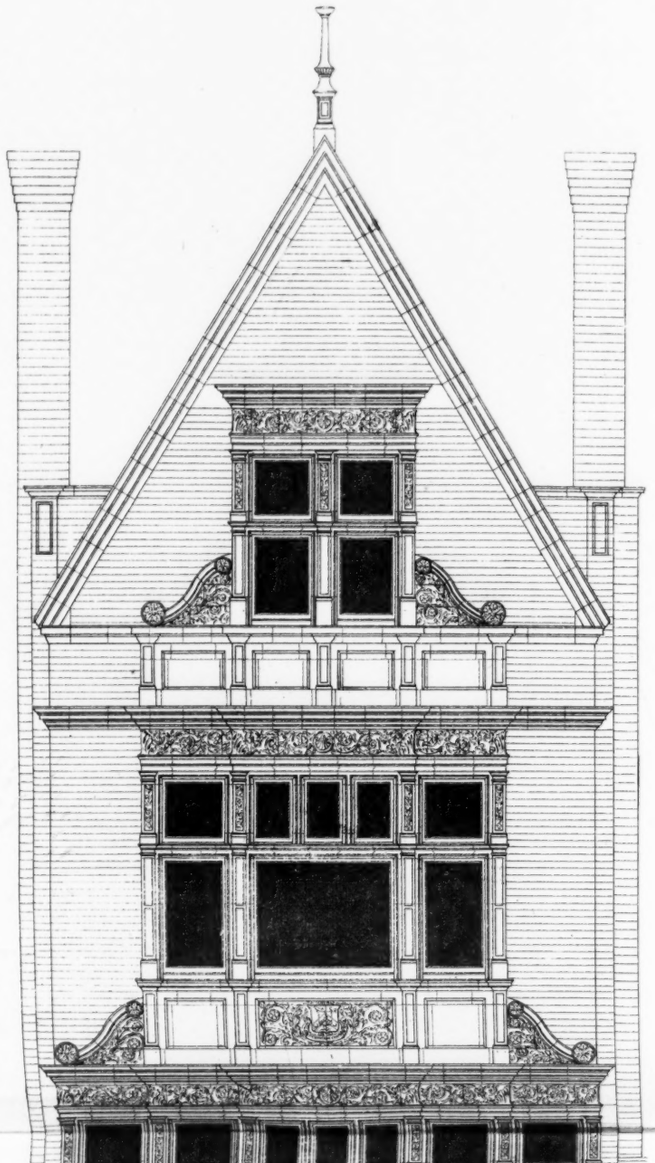
8, Castle St Holborn, London, E.C.

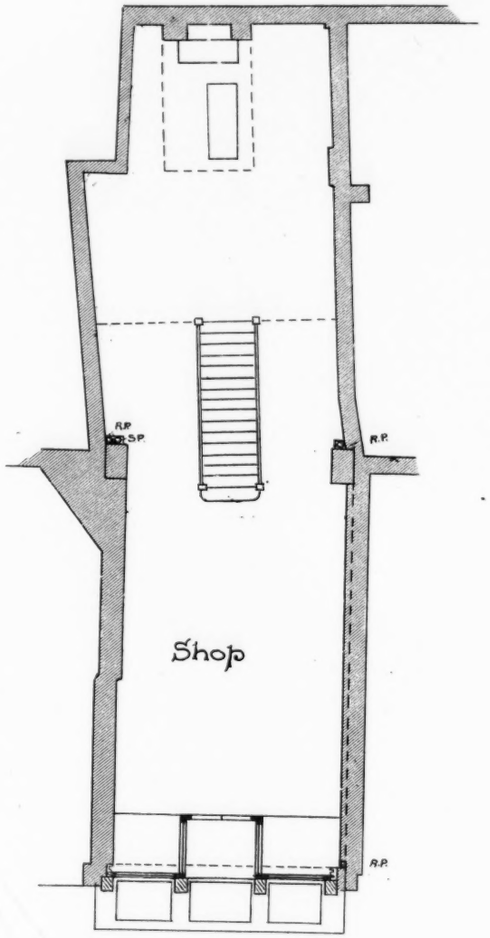
C.F. Kell Photo-Lith & Printer

8, Castle St. Holborn, London E.C.

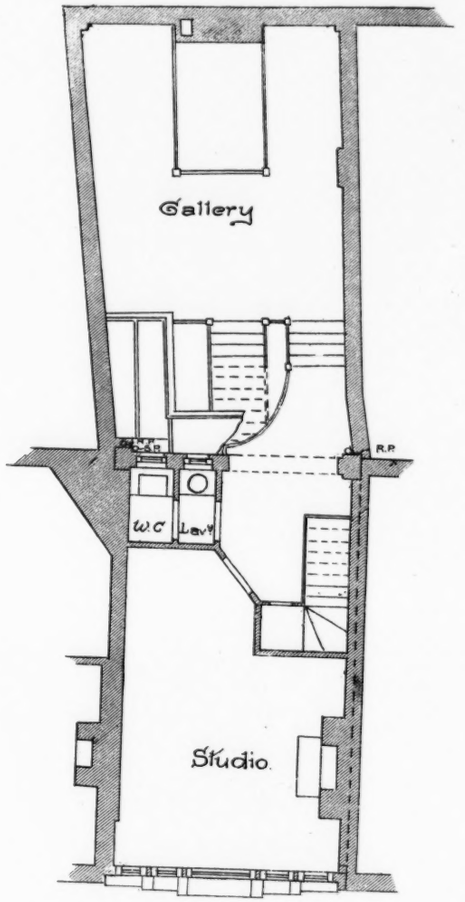
THE TRIUMPHAL ARCHES OF THE ROMANS.

ARCH OF THESEUS AND HADRIAN, ATHENS. *From an Engraving by Andrea Gasparini.*





Ground Floor Plan



First Floor Plan

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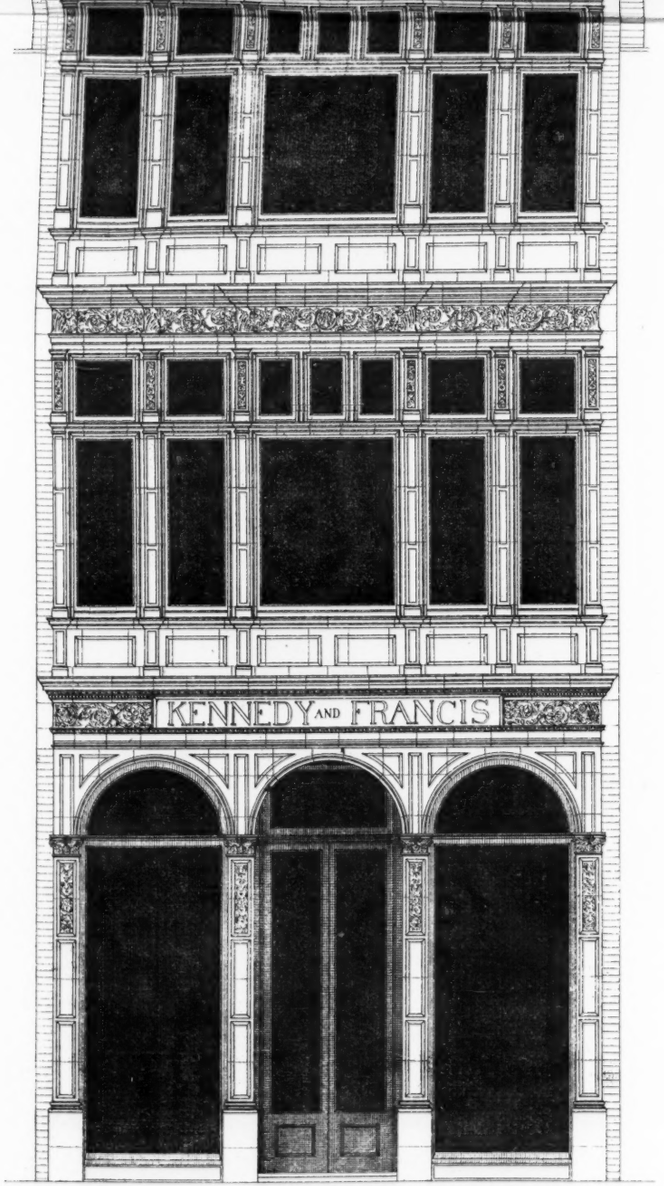

FRONT IN TERRA COTTA · Nº 17 OXFORD STREET ·

MESSRS BATTERBURY & HUXLEY ARCHTS

Scale of Feet

GROUND FLOOR PILASTER.

SOFFITE OF GROUND FLOOR ARCHES.

GROUND FLOOR FRIEZE.

PHOTO. SPRAGUE & CO. 22 MANTUA LANE, CAMDEN ... LONDON, N.C.

HOLBOROUGH COURT, SNODLAND, KENT.—M

"INK-PHOTO," SPRAGUE & Co. 26, MARTINS LANE, CANNON ST, LONDON, E.C.

ENT.—Mr. Hubert Bensted, F.R.I.B.A., Architect.

SANITARY EXHIBITION AT YORK.

THE Exhibition opened at York on Tuesday last, in connexion with the ninth Autumn Congress of the Sanitary Institute of Great Britain, is a fairly good one, though it is, perhaps, not so large and hardly so varied in character as some previous exhibitions. Nevertheless, it may be regarded as a typical exhibition of most that is latest and best in sanitary materials and appliances, and as containing a good percentage of novelties, which, however, are not in all cases so ostentatiously displayed as to be seen without looking for. The chief of these which came under our notice during a necessarily somewhat hurried survey of the contents of the Exhibition are commented upon in the following lines, but before we pass on to speak of them in detail we must give a word of praise to the organisers of the Exhibition and to the exhibitors themselves for their business-like procedure and co-operation, whereby the Exhibition was quite ready for opening when the hour arrived. To promoters and exhibitors at other exhibitions we would say "Please copy." Nor must we forget to commend the judges for their assiduity in having, as far as might be, completed their work before the opening of the Exhibition, their decision as to certain exhibits being deferred for further experiment and trial. The judges on this occasion are Prof. W. H. Corfield, M.A., M.D. (Chairman); Mr. A. Wynter Blyth, M.R.C.S.; Prof. F. de Chaumont, F.R.S.; Mr. W. Eassie, C.E.; Mr. Rogers Field, B.A., C.E.; Mr. Henry Law, C.E.; Mr. J. Wallace Peggs, C.E.; Mr. H. Saxon Snell, F.R.I.B.A.; and Mr. Ernest Turner, F.R.I.B.A. A list of their awards, so far as they relate to matters of interest to our readers, will be found at the end of this notice.

The contents of the Exhibition are divided into five classes, viz.,—I., Building Materials, Machinery, and Construction; II., Water Supply and Sewerage; III., Heating, Lighting, and Ventilation; IV., Antiseptics and Disinfectants; V. Miscellaneous. These several Classes are subdivided into Sections.

In Class I. (Materials and Construction), the Wortley Fire Clay Company exhibit their excellent white and coloured glazed bricks and salt-glazed bricks. Hard by, Messrs. W. & R. Leggott, of Bradford, show their very handy, simple, and easily-worked appliances for opening fanlights and skylights, including the patent "Apex" Fanlight Opener, which is a new variety of Messrs. Leggott's appliances. It differs from other arrangements inasmuch as it requires no hinges or pivots. Leggott's "Security" bolt is well adapted for high doors and French casements; it shoots both ways at once, and its continuity is a safeguard against the warping of the frames. Messrs. Edward Smith & Co., of Coalville, have a small show of very good sanitary floor and wall tiles. Messrs. Wright & Co. of Westminster, exhibit the application of their capital fireproof "fixing blocks," by means of which joinery and woodwork of all kinds can be readily secured to walls. Messrs. Casebourne & Co., of West Hartlepool, are exhibitors of Portland cement in different stages of manufacture, and the Sanitary Dry Lime Company exhibit Williams's patent dry lime and mortar for sanitary and constructive purposes. Messrs. Thos. Wragg & Sons, of Swadlincote, Burton-on-Trent, exhibit air-bricks, fire-bricks, and glazed bricks, and Messrs. Joseph Cliff & Sons, of Wortley, near Leeds, have some good white and coloured glazed bricks. The Dœker Hospitals and Huts Factory Company exhibit (Stall No. 101) a "Dœker" portable hospital for infectious diseases, the distinguishing feature of which is that the "walls" are composed of a series of movable framed panels covered with paper, felt, and canvas. The construction of such temporary structures would be facilitated by the use of the Willesden Waterproof Paper and Canvas, which is also made in a form specially adapted for its use as a damp-course (exhibited at stall 110). How far it would prove durable when so applied we have no means of knowing. In section 3, Messrs. Quirk, Barton, & Co. exhibit their laminated lead and lead-foil for damp walls. In Section 5 several varieties of sanitary flooring are exhibited by Messrs. M. C. Duffy & Sons and other firms. Decorative materials are shown in Section 6. These include some embossed majolica bricks and tiles exhibited by the Wortley Fire-Clay Company, and other exhibitors. In Section 7, "Machinery Adapted for Sanitary Purposes," Mr. E. S. Hindley shows the "Alcázar vertical steam engine."

The exhibits in Class II., "Water Supply and Sewerage," constitute a very large and important part of the exhibition. In Section 1, Surgeon-Major Pringle, late of the Sanitary Department of the Bengal Army, again exhibits his "Sursum" automatic water purifer, which we described last year in our account of the Leicester Exhibition. There are other exhibitors in this section, but there is nothing specially noteworthy. In Section 4 there are a few exhibits worth special mention, among them Messrs. W. Phillips & Son's "Cerus" patent flushing syphon, which differs somewhat materially from most appliances of the kind, as will be apparent by a reference to the section of it which we published in the *Builder* for July 11, 1885 (p. 72). In Section 5 the same exhibitors show the "Cerus" sink, which embodies some useful improvements. It is made in one piece of salt-glazed or enamelled stoneware, with a rounded instead of square rim. The bottom is made with a fall, and has channels along the sides. Messrs. Joseph Cliff & Sons, of Wortley, exhibit the "Cecil" porcelain slop-sink, with flushing rim. In Section 7 Messrs. Phillips & Son show the "Cerus" patent closet, in which the basin and trap are constructed in one piece of earthenware. The closet is an attempt, and apparently a successful one, to combine the advantages of the "wash-out" and "valve" types of closet. Messrs. Joseph Cliff & Sons exhibit their "Dolphin" Closet, which is of the "pedestal" variety, and "wash-out" in action. Its designer has apparently been studying "grotesques," for externally the closet presents the appearance of what may be described as a dolphin-headed sea-serpent with open jaws, trying to swallow an enormous shell, this "shell" being the pan itself. The O-trap beneath the pan is a continuation of the body of the dolphin-headed creature. The closet is not meant to be enclosed by wood boxing, and the effect of its form is very much dependent upon the way in which it is coloured externally. But even in garish white and gold it is, perhaps, preferable to the ivy-clad-tree-stump-like "pedestals" which are being used for closets of this kind. Messrs. Doulton & Co., of Lambeth, exhibit, amongst other appliances of a kindred character, an improved trough closet. In Section 9, the same firm show their new patent self-adjusting joint for drain-pipes, which seems likely to meet some long-felt requirements. From tests that have been made at the Exhibition and elsewhere, it is clear that the joint permits of a considerable amount of flexibility, and therefore of the deflection, of a line of pipes where necessary in order to avoid any unforeseen obstruction in laying. This quality of flexibility in the joints has the advantage that no ordinary settlement of the ground will permit of their leakage. The joint consists in the contact of two surfaces of Stanford's patent material, but differently distributed and arranged than in the ordinary form of the Stanford joint. By this new invention no joints have to be made after the pipes are put together, and the pipes are ready for use as soon as they are laid. For this reason the joint is especially serviceable for pipes laid in wet and treacherous ground, as the trench can be filled in as the pipes are put together. The pipes can be laid round a curve (the radius varying with the diameter of the pipes) without impairing the efficiency of the joint. No cement being used, none can remain (as is frequently the case) inside the pipes to cause obstructions.

We will complete our notes on the contents of this Exhibition next week.

The following, among other awards, were announced at the opening of the Exhibition on Tuesday:—

Medals.

Casebourne & Co., West Hartlepool, for Faija's cement-testing machine.
Waterproof Paper and Canvas Company, London, for Willesden paper roofing.
Harris, J. F. & G., London, for Moulded wood decoration.
Dœker Hospitals and Huts Factory, London, for Dœker portable hospital.

Special Certificates.

The following have received Medals in previous years, and now are granted Special Certificates:—

W. & R. Leggott, Bradford, for opener for fanlight and skylight.
Washington Lyon, London, for Lyon's steam disinfector.
Cliff, J., & Sons, Leeds, for Imperial porcelain bath.
Morrell's Sanitary Appliance Company, Manchester, for portable cinder-sifting ash closet.
Moule's Earth Closet Company, London, for Moule's earth closet.

Certificates of Merit.

Burn & Baillie, London, for galvanised cast-iron air-tight inspection chamber and drain-pipe.
Wortley Fireclay Company, Leeds, for salt glazed bricks.
Cliff, J., & Sons, Leeds, for Hall's hanging tiles.
Wright & Co., London, for fireproof fixing blocks.
King & Co., Hull, for Fishbourne's tubular refrigerators.
Hindle, Norton, & Co., Oldham, for Acme door-check and spring.
Smith, E., & Co., Coalville, for vitreous floor tiles.
Adams & Co., York, for thirty-gallon combined flush-tank and grease interceptor.
Cliff, J., & Son, Leeds, for white enamelled sinks.
Wortley Fireclay Company, Leeds, for white enamelled sinks.
Cliff, J., & Son, Leeds, for white enamelled urinal floor channel.
Wragg, T., & Son, Burton-on-Trent, for Mawbey's joint for stoneware pipes.
Cliff, J., & Son, Leeds, for "Simplex" reversible gully.
Wortley Fireclay Company, Leeds, for Simpson's street gully.
Bailey & Co., London, for Woodman's stoneware screw plug and collar for access to drains.
Burn & Baillie, London, for "Eclipse" apparatus for testing drain and other pipes.
Phillips, W., & Son, London, for "Brontes" air-tight cast-iron manhole cover.
Cliff, J., & Sons, Leeds, for white and coloured glazed bricks.
Wortley Fireclay Company, Leeds, for white and coloured glazed bricks.
North of England School Furnishing Company, Darlington, for Westminster single desk, with sliding top, and convex support to the seat.
Cliff, J., & Son, Leeds, for "Imperial" slop sink.
Burn & Baillie, London, for indiarubber expanding plugs for drain testing.
Potter, G. W., London, for "Siphosella" pipe fastening.
Trott, H., London, for bib valves for hot and cold water.
Braithwaite, H. & Co., Leeds, for syphon action water-waste preventer.
Casebourne & Co., West Hartlepool, for Schaible's apparatus for the extinction of carbonate of lime in cement.
White, W. P., & Co., London, for Nicholls's hospital pail.

Exhibits selected for further trial.

With regard to the following exhibits, the judges are unable to give their decision until they have submitted the exhibits to a more complete and extended practical examination than is possible at the exhibition.

Adams & Co., York, for sewer ventilator and sewer gas deodoriser for manholes.
Casebourne & Co., West Hartlepool, for Portland cement.
Doulton & Co., Lambeth, London, for lavatory valves.
Gritten, C. E., London, for "Queen" filter.
Gray, J. W., & Son, London, for "Howatson" water softener.
Burn & Baillie, London, for combination bath fittings.
Wragg, T., & Son, Swadlincote, for Hassell's safety joints.
Doulton & Co., London, for self-adjusting joints for stoneware pipes.
Bailey & Co., London, for Irving's filter.
Doulton & Co., London, for improved manganous carbon filter.
Cliff J., & Son, Leeds, for "Cecil" slop sink, with flushing rim.
White, W. P., & Co., London, for dry closets.
Æolus Waterspray Ventilating Company, London, for Æolus waterspray ventilators.
Hale, R. W., & Co., London, for exhaust and downcast ventilators.
Honeyman, J., Glasgow, for diaphragm ventilator.
King, P. P., & Co., Hull, for Phillips's ventilator.
Kite, C., & Co., London, for exhaust, downcast, and chimney-breast ventilators.
Wright, E. G., Portsmouth, for "Reliance" chimney cowl.
Maignen, P. A., London, for water-softening process.
Barstow, J., Pontefract, for combination water filters.
Magnetic Filter Company, London, for Spencer's magnetic filter.
Maignen, P. A., London, for Filtre Rapide.
Silicated Carbon Filter Company, London, for improved silicated carbon filters.

Exhibits classed under Lighting, including electric lighting, heating, and cooking apparatus, machinery adapted for sanitary purposes, laundry appliances, and furniture, are still under the consideration of the judges, whose names are mentioned in a previous column.

The Exhibition will remain open until and including Saturday, October 16th, from ten a.m. to ten p.m. It is held in the large Exhibition Buildings of the York Fine Arts and Industrial Institute, Bootham Bar.

Institution of Civil Engineers.—The members of the Association of the Birmingham Students of this Institution, through the kindness of the manager, made a visit to the Sandwell Park Colliery on the 17th inst. They were met at the colliery by Messrs. Hughes and Lloyd, who conducted them round the pit, explaining the mode of working, including the mechanical haulage. Some experiments in working the seams (without the use of blasting) by means of Walcher's Patent Hydraulic Coal-breaking Apparatus were being made which were witnessed with great interest. Upon re-ascending to the pit's mouth the members were afforded an opportunity of inspecting the whole of the engines and machinery used in connexion with the works. Before leaving, a vote of thanks was accorded to Messrs. Hughes and Lloyd, and the members expressed themselves very much gratified by the manner in which the workings had been explained.

"THE INFLUENCE OF GROUND-WATER ON HEALTH."

THIS was the subject taken by Mr. Baldwin Latham, M. Inst. C.E., President of the Engineering and Architectural Section of the Sanitary Congress at York, for his address, delivered on Thursday morning. He said,—

In presiding over this section, which is devoted to engineering and architectural subjects, it is necessary that I should say that I have been requested to address you upon a subject which properly belongs to the Climatological Section, namely, upon the probable influence of ground-water on health. This request has no doubt been made in consequence of some observations which have been made in this city by Mr. North, the Medical Officer of Health, who has traced some connexion between an outbreak of typhoid fever which occurred here in 1884, and the movements of the subsoil water at that time.

Having devoted much time during the past eleven years specially to the study of the question of underground water, and having established and maintained a number of stations for observing the relative height of subsoil water in various parts of the country, and having also collected the past records which are available in this country and elsewhere, I am in possession of facts not easily obtainable, and am able, therefore, to draw some definite conclusions as to the probable influence of ground-water upon health. Having regard to what may be called historical records, great periods of drought clearly indicate a low state of the ground-water. In looking through ancient records there are some remarkable references to the influence of drought in producing disease. The influence of light in destroying noxious properties arising from decomposing matter is also clearly indicated, and it is pointed out that the effect of keeping back the waters of the sky and not suffering them to be poured down on the earth, would be that the noxious animals which live in the water will pollute it.

No inquiry into the question of the influence of climate on disease would be complete without reference to the labours of Hippocrates. It is curious to note in his works, written upwards of 2,000 years ago, that there are conditions recorded, attending healthy and unhealthy seasons, which are identical with the conditions which may be observed in this country at the present day. Hippocrates taught that all disease may be traced to natural causes, and he counted it impiety to maintain that any one more than another is an infliction of the Divinity. He pointed out to his followers that if they wished to study medicine properly, in the first place they must study the seasons of the year, and the effects which they produce. He also stated that acute diseases occur in periods of drought, and that you could tell what epidemic diseases would attack a city either in summer or winter, and what sickness each individual would be in danger of experiencing. He went much further than our knowledge at the present time enables us to go; for he stated that the changes of the seasons may be predicted from the rising and setting of the stars, so that we should know beforehand what sort of a year is going to ensue. Hippocrates also pointed out the conditions affecting a healthy period. Rains in autumn, a mild winter, neither very tepid nor unseasonably cold, and rain in spring and summer, the year is likely to prove healthy; but if the winter is dry, and the spring showery, the summer will necessarily be of a fertile character. If, at the rising of the Dog-star, rains and wintry storms supervene, there is reason to hope that disease will cease, and the autumn will be healthy.

It is curious that a dry winter is often the precursor of disease, not at that time, but in the following autumn. As a rule, a short supply of rain in December has a most marked influence upon the stores of underground water, and a deficiency of rain in this month has probably a greater effect in influencing the future health of any particular district than it has in any other month of the year. As a type of a healthy season the present year is an example, and fully complies with the conditions laid down by Hippocrates.

It may be interesting to note that some years ago Dr. Laycock published an interesting account showing the incidence of disease in York, from which it appeared that this city was always susceptible to violent outbreaks of disease, traceable to local sanitary circumstances combined with peculiar climatological conditions, and that there appeared the same incidence in the prevalence of the sweating sickness of 1550-51, the plague of 1604, and the cholera of 1832, to which might be added the typhoid fever of 1884.

The results of my prolonged investigations on the subject of ground-water in this country and elsewhere, clearly show that there is generally a direct parallelism between the conditions of health and the volume of ground-water. The years in which there has been a large quantity of ground-water present have invariably been the healthiest years, while those in which there has been a small quantity have invariably been the most unhealthy periods.

As a rule the lowness of the ground-water indicates the future health, and not the state of health at the particular time of lowness; that is, the unhealthy period, as a rule, follows the period of low water, the degree of lowness indicating the intensity of future disease, especially fever. In some cases an unhealthy period runs concurrently with the period of low water, but in all these cases there is clear evidence that percolation has recommenced before the unhealthy period takes place. These results are entirely confirmed by observations which were carried on in Paris between the years 1868 and 1883, and which have been collated and published by M. Durand Claye, Chief Engineer of the Municipality of Paris, with the object of putting all the facts and circumstances in connexion with the outbreaks of fever in Paris at the disposal of those who might choose to investigate the subject,—a course strongly contrasting with the conduct of some authorities in this country, who desire rather to hide the true facts from public view.

The observations which have been published by Professor Pettenkofer, and which were commenced in 1854, differ from the experience gained in this country, as he has shown that typhoid fever in Munich commenced with the fall of the subsoil water, and reached its greatest intensity with the greatest degree of lowness, and with the rise of the water there was a diminution of fever, a result exactly contrary to experience in this country. Professor Pettenkofer's observations, however, agree with the observations made here, in the fact that the greatest intensity of typhoid fever coincides with the periods of the greatest degree of low ground-water; that is, those years in which the subsoil water has fallen to its lowest level are those in which there has been the most fever.

With regard also to the experience in this country as to subsoil water it may be pointed out that there is clear evidence that the lowering of the subsoil water by artificial means will produce, and does produce, a tendency to the development and dissemination of typhoid fever. The effect of drainage works during their construction in lowering the subsoil water where precautions have not been taken to speedily and permanently get the water back to its proper level has been, in many instances, the cause of outbreaks of typhoid fever, but which at the time have been attributed to the construction of the sewer works and to sewer gas, even in cases where no connexions had, at the time of the outbreak, been made with the sewers.

It may also be pointed out that at the time of the outbreak of cholera in East London, in 1866, as to the cause of which there has been so much dispute, the very district which was most afflicted with cholera, had, at the time, its subsoil water unduly lowered by the construction of the main drainage works in that part of the metropolis, and on the completion of this work and the sewers being brought into operation the epidemic terminated. . . . .

It is curious that in recent times, as a rule, there has been, every ten years, a marked period of low water; for example, in 1834–5, 1844–5, 1854–5, 1864–5, 1874–5, 1884–5. The lowest water in these series probably occurred in 1864–5. In 1844–5 the low water was not intense, but it was low compared with the period. In addition to these periods, there are other times of low water, and in investigating the subject it should be studied locally and comparison made with local vital statistics, for the largely-varying distribution of rain tends to equalise results when spread over large areas, as it is rarely that the same conditions occur over extended areas at the same time.

I have been carrying on, as many of you know, very extensive observations at Croydon, and from the results there obtained have extended them into various geological formations in different parts of the country.

The register of Croydon goes back to the year 1539, and, with the exception of years in which there has been revolution or disturbing causes of a kindred character, the record is complete. A tabulation of the whole of the burials and baptisms, extending from this early period to a date overlapping that when registration of births and deaths commenced, clearly indicates that years of drought are, without exception, the most unhealthy periods. In 1539, the first year of registration at Croydon, there is a record that in this particular year the springs were remarkably low, so low that the River Lea was nearly dried up, and writers of that age remark on the great drought and heat of that period. In that year the number of burials recorded in Croydon was 50 and the number of baptisms 55, indicating a probable death-rate of 25·6 per thousand. In the following year on the rise of the water, the burials rose to 87 and the baptisms 72, indicating that the death-rate was nearly 32 per thousand. Coming to the period when we have rain-fall records, the year 1741 was a very dry time, the rain-fall at Lyndon for the year being 15·7 in., and in that year the burials in Croydon were 271, and the baptisms 113, giving a probable death-rate of 63·7 per thousand, while in the two years preceding this year the death-rate was 27·7 and 40·7 per thousand, and in the following year 24·2 per thousand. Coming to more recent periods, when we have the certain records collected by the Registrar-General, registration having commenced in the dry year of 1837, the death-rate at Croydon was 30 in the thousand, and in the following year a similar rate occurred. In the years of very low water, 1854 and 1855, we had death-rates of 26·84 and 21·14 respectively, while in 1851, the death-rate was only 18·72 per thousand. In the dry periods, 1864 and 1865, we had death-rates of 21·5 and 22·7 per thousand, while in 1860, a wet year, and one of high springs, the death-rate was only 17·27 per thousand. The year 1871 was another dry period, but the low water at Croydon was not so pronounced in this year as in most other years. The death-rate was not so high, viz., 18·89 per thousand, but in 1873, when the springs were very high, the death-rate fell to 16·59 per thousand. After the dry period of 1874–75, the death-rate rose again to 21·10 per thousand. From 1876 up to the beginning of 1884, there has been unprecedented high water, and during the whole of this period the country generally has enjoyed a high state of public health. The conditions, however, which have brought about this high degree of health, have been disastrous to the interests of the agriculturist, as the large quantity of water passing into the ground has washed away the fertilising elements, but it has secured for us the estimable boon of good health by removing the conditions which are the cause of much sickness, suffering, and death. . . . .

It is clear to my mind, after the most careful consideration of this subject, that ground-water itself has no influence, either for good or evil, upon health, but that the lowness or highness of the water in the ground is the index of conditions which greatly influence the health of all communities. We have periods of abundance of water, and periods of low water with both healthy and unhealthy conditions. Ground-water has been shown by Professor Pettenkofer to be chemically more impure in periods of high water when the conditions were favourable to health than when there is a low state of the ground-water, and a condition unfavourable to health. The records also show that we have periods when rain has started into existence malignant diseases, while, on the other hand, we have similar heavy rainfalls accompanied by a high state of public health as in the present year.

The records clearly point out that it is not one circumstance alone which produces disease, but that there are at least three factors necessary for the production and distribution of disease, especially typhoid fever, viz.:—1. The elements which produce disease, such as a polluted state of the ground. 2. The conditions which are necessary for the development of disease, such as a period of dryness of the ground in those regions which water usually

occupies, combined with a comparatively high degree of temperature. 3. Conditions which will lead to the spread of the disease, such as the probable influence of a storm or rain in driving impurities out of the ground into our water supplies, or through the instrumentality of ground air passing into our habitations, and its reception by a population which is in a condition to receive such germs of disease. If any one of these conditions is absent, diseases like typhoid do not occur.

The long period of washing and purification which the ground has passed through since 1876, has generally so purified it from the producing elements of typhoid fever, that with the exception of occasional cases of impurity where the ground has become fouled from the leakage of sewage from the imperfect sewers into the ground, as in the case of this city, Beverley, Kidderminster, and some other places which had epidemics in the low-water period of 1884, the country has enjoyed immunity from diseases of this class. On the other hand, if we take a period when there has been marked low water for a number of years, followed by unusually low water at particular periods, these are the times when typhoid fever is most rife, as, for example, between 1854 and 1865, with the exception of the years 1860 and 1861, when we had a high state of ground-water. The intensity of the fever rates of 1865 and 1866 point out a lesson which ought to be learned by every sanitarian,—that we must keep the ground free from impurity, if we are to secure conditions which are essential for the promotion of health.

When we come to deal with local conditions preceding disease, we find that not only cholera and typhoid fever, as pointed out by Prof. Pettenkofer, are amenable to the conditions indicated by the highness or lowness of the ground-water, but probably all other zymotic diseases are influenced by the conditions which produce low ground-water, with the exception of diarrhœa. . . . . .

We must not, however, lose sight of other conditions which are at work, such as,—

(1.) *The influence of light.* It will be observed with reference to the period of percolation that it is almost parallel with the time the sun is below the horizon. The influence of solar light is well known in malarious countries, which may be traversed with impunity while the sun is above the horizon, but they become dangerous after night-fall. (2.) *The influence of temperature.* There is no doubt that, in winter time, many diseases are aggravated by the intensity of cold, but cold is not essential to the promotion of disease, especially in children under five years of age. This was shown by the late Dr. Farr, and in the volume recently published by the Sanitary Institute, it is pointed out that the death-rate of children in Norway is lower than that of England, while the death-rate of children in England is lower than in Italy, indicating that at this period of existence cold is not detrimental to life. When we come to isolate the deaths in particular months, and compare them with the periods of low water, it often happens that extreme low water in winter corresponds with periods of great cold, and low water in summer also corresponds with periods of great heat, and it is only at such times when we are able to discount these influences by comparing them with periods when we have a normal state of things with reference to temperature, and abnormal in regard to ground-water, that the influences measured by the ground-water are brought into prominent relief. . . . .

A very marked circumstance in connexion with ground-water, and the period of percolation, is shown in the case of deaths of children under five years of age. While there may have been mistakes with reference to the causes from which a child dies, very little error occurs with regard to its age. I am of opinion that the proper way of estimating the sanitary state of any period in any district, is by taking the number of children under five years of age and calculating the deaths by the number living at these ages. The figures show, especially after deducting the deaths from diarrhœa, which are influenced by high temperature, that there is an almost exact parallelism between the period of percolation and that of deaths occurring at those ages, the smallest number of children dying in the month of June, and the largest number in December and January. Moreover, the death-rate from year to year fluctuates in a very marked manner with the fluctuations of the ground-water. The most healthy periods in which there is the most ground-water, and the least healthy are those in which there is the least ground-water in any year. These results corroborate the strong relation which exists between the highness or lowness of water in the ground in regard to zymotic diseases. It also shows that there are influences at work, which can be measured by the quantity of water in the ground, which are destructive to young life, and which may be guarded against, as these influences indicate themselves many months before they begin to affect the population; therefore "to be forewarned is to be forearmed."

The fluctuation of the water line is an essential condition in the development of disease, especially typhoid fever and cholera. It has been pointed out by Professor Pettenkofer that in those districts in which the rivers are held up at uniform levels by weirs, the conditions are favourable to health, and in such districts cholera rarely becomes epidemic. In a great measure this is corroborated in this country by the state of health at our sea-side resorts, which being the natural outflow for ground-water, and owing to the uniform height of mean tide level, are without exception placed in a condition favourable to health. We have also the record in connexion with the city of York, in which it is clearly shown by Dr. Laycock, in his report on York, published in the first volume of the Health of Towns Commission, that previously to the construction of the lock at Naborn below the city, the tide used to flow up above York, and there were considerable variations in the level of the waters from time to time, but after the construction of the lock in question the health of York materially improved. The health of districts, such as the Wandle Valley, is proverbial. In the latter district there are a large number of mills in a comparatively short length holding up the water to a uniform level.

With such examples for our guidance it is clear that sewers may be of great advantage in maintaining uniformity in the water level. On the other hand, leaky sewers are liable not only to pollute the ground, but to cause considerably greater variation in the levels of underground water than would otherwise occur in various parts of the district. Good land drainage has a tendency to produce uniformity of water level, but this should rarely be attempted to be secured through the instrumentality of sewers carrying polluted matters. The influences which are observed clearly point out how important it is to guard districts against pollution of the earth. How little regard, however, has been paid to this point, for it is only within the last ten years that the importance of making sewers as water-tight as possible has received serious consideration, and still, in many parts of the country, sewers are being constructed without any regard to water-tightness and their other influences on ground-water. Moreover, a large number of burial-grounds have been established, in quite recent periods, in positions with respect to underground water which more or less exercise a baneful influence on the health of the localities in which they are situated. Cesspools, ash-pits, and middensteads are still permitted to poison the air, ground, and water. No wonder that the towns which possess the means of most readily polluting the ground have, without exception, the highest rates of mortality. There can be no compromise in sanitary matters. What should be the aim of all sanitarians is the preservation of the ground from all impurities, especially in districts where the soil is of a porous character, and, above all, no supplies of water for dietetic purposes should be permitted to be taken from wells sunk in the immediate subsoil in populous places, and to secure the full measure of health, our houses should be so constructed as to prevent the admission of ground air into them.

SANITARY SCIENCE AND PREVENTIVE MEDICINE.

PROFESSOR F. DE CHAUMONT, F.R.S., President of the Sanitary Science and Preventive Medicine Section of the York Sanitary Congress, on Wednesday opened that Section with an address, in the course of which he said,—

The title of our section is that of "Preventive Medicine," or rather "Hygiene and Preventive Medicine." It may, perhaps, be well to consider what these terms mean, and what we are expected to do or to concern ourselves with. The meaning of hygiene is now pretty well known as the art of preserving health, although the origin of the term is rather obscure, few perhaps having cared to trace it beyond the fabled daughter of Esculapius, by which myth I feel pleased to think that a compliment is being paid to Medicine by making Health its daughter. It certainly has not always been thus in more senses than one, for health is very far from favouring those who are continually consuming drugs, whilst medicine has not infrequently been deprived of what it has been justly entitled to, namely, credit for the efforts its votaries have made for the perservation of health and the checking of disease, even when against their own material interests. But what, you may ask, is the meaning of "Preventive Medicine"? Is it preventing disease by physicing people? or, is it to prevent the doctors from physicing people? Both of these proceedings might have their advantages, but they do not really explain our meaning. In the good old times, when the smuggler was a more common and (at this distance of time, at least) a more picturesque object around our coasts, the Preventive Service was in every one's mouth, and its duties were well known. Those duties consisted in preventing the introduction of contraband material into the country, material which it was believed would undermine the financial constitution of the country. So it is with our preventive medicine: it is a service the duty of which is to prevent the introduction, the slipping in (*einschleppung*) of contraband material into our bodies and undermining their constitution. Its functions are as old as,—nay, older than,—history itself, although its development into systematic usefulness is a thing of yesterday; but so rapid has been its development that we even take upon ourselves to talk of the *science* of preventive medicine, hurrying up the question a little in our pardonable eagerness to progress. It must be admitted that a science, rightly so-called, is a very serious thing; it means a state of knowledge of causes and effects, precedents and succedents, antecedents and consequences, such that we may, with given data, confidently predict a result that shall never fail us. Tested in this way, how much true science have we got? . . . .

We may, however, feel assured that in spite of all shortcomings on our part, partly arising out of inability to appreciate the essential points, but largely from actual ignorance of facts, we are entitled to speak of a science as existing, even although we may be most imperfectly acquainted with its laws. This imperfection becomes all the greater when we have to deal with subjects which are more and more removed from abstract principles, and are consequently more and more complicated in their action. And when we come to consider a subject like preventive medicine, whose existence depends upon the previous existence of other sciences, themselves confessedly imperfect, the difficulty becomes greatly enhanced, and the effective working on sound scientific principles seriously hampered. It must be quite obvious that progress in this direction is governed by our previous knowledge of the nature and the causes of disease, and that while these remain obscure, their prevention must be obscure too, and at best be reached in an empirical and haphazard way.

People are inclined sometimes to reproach the medical profession for not knowing more on these subjects than they do; but this reproach is not very just. In the first place, the profession as a whole consists of men who work hard for their living, and have little or no time for scientific inquiry, although it may still be said to their credit that even some of the hardest worked have found time to add valuable contributions to the sum of medical knowledge. In the second place, the inquiries themselves are exceedingly laborious and difficult, such that no one man or set of men could possibly carry out; and it not infrequently happens that it is only after a long series of observations, which had apparently but little individual significance, that the truth is perceived at last, and some clear-headed worker steps into the inheritance and enjoys the renown which is the outcome of the conjoint work of a former host of obscure but earnest labourers. Often, too, the eye of genius can penetrate the future and see, as in a vision, what can be proved and reduced to concrete fact only by long years, if not generations, of work, requiring for its

carrying out methods and appliances, utterly undreamt of when the idea was first shadowed forth. It is thus that we can trace a perception of the principles of modern pathology and practice in the writings and speculations of men of former ages, whose genius seemed capable for a moment of lifting a corner of the veil which concealed the future from the common eye. . . . .

In 1879, at the International Medical Congress at Amsterdam, there was a discussion in the Hygienic section on the subject of the examination of drinking-water. I maintained the necessity of supplementing the chemical by a microscopical examination in every case, in the hopes of obtaining in that direction information which chemistry seemed incapable of furnishing. Considerable experience had taught me what chemistry, in its existing condition as a science, could and could not tell us, and I felt that, whilst chemistry helped us a good deal, it was in all probability the microscope that would ultimately reveal to us, somehow or other, the germs of disease. I was interrupted by the author of the paper under discussion with the question, "A-t-on jamais vu un germe?" I was obliged to confess that I did not think any one ever had, or recognised it as such if he had seen one.

Now, as a test of progress in the seven years that have elapsed since then, it may be asked, "Would my answer be the same to-day as it was then?" The same, yes; but with a difference. It is true that we have the Bacillus of Anthrax and the Bacillus of Tuberculosis, the connexion of which with these diseases is undoubted, but it still remains to be *proved* that each is *teterrima causa morbi*. On the other hand, Cholera Bacillus and some others less generally known, are by no means in the same position, for much has to be done and proved before they can be invested even with the comparatively established status of the two first named. Thus my answer would have to be something like this:—"We cannot positively affirm even now that a germ has been actually seen, but certain microbes have been recognised as being constant in certain forms of malady. Our methods of observation have also been vastly extended, and there is every reason for hope for the future." Since that time a powerful aid has come to the microscope, in the method of cultivations of minute organisms, *Reinculturen*, as the Germans, who have done so much in this direction, have called them. By these means much information has been obtained, which neither chemistry nor the microscope unaided was capable of yielding, teaching us something of the life history of those remarkable organisms and their relations to each other, as well as to the more highly organised beings upon which they seem to prey. On account of the failure of the highest powers of the microscope to detect any signs of life in liquids, which later on gave undoubted proof of containing organisms, it was surmised that spores might be present, either so minute or with refraction differing so little from the media they existed in, that it was impossible to see them. Cultivation in nutrient media, aided by improved manipulation and methods of preparation and staining, has revealed quite a new world of living things. It has also shown that in this mikrokosm there is a reign of law as there is in the communities of our makrokosm, an antagonism of races as there is among men themselves, for some organisms which grow and flourish when cultivated alone, decay and perish in the presence of others, just as one race of men or animals seems to fade before the encroachments of another.

Taking advantage of this, attempts have been made, crudely and somewhat prematurely, to play off, as it were, one microbe against another, as in the proposal to fight the Bacillus of Tubercle by regulated inhalations of Bacterium Termo, the common microbe of putrefaction. These attempts have, up to the present time, resulted in failure; and this need not surprise us, for we do not know all the question yet, and we must creep before we walk. There seems, however, good reason to think thst there is some foundation for the notion, and that the method may yield fruit hereafter. But these researches in this new branch of Bacteriology have led to still further considerations, for they have shown that most of the activity of nature is dependent on those minute organisms. This has long been known to be the case in ordinary fermentation and putrefaction, whilst the resemblance between the action of disease-poison and the process of fermentation gave rise to the term "zymotic" (from ζύμη, a ferment), as applied to diseases which seemed to proceed with a quasi-fermentative process. It was also reasoning from those more familiar cases that led Pasteur and others to the investigations which have brought out such surprising results. There seems every probability that processes which were formerly looked upon as purely chemical, such as nitrification, are brought about by bacterial agency; and, indeed, this has been positively proved in the case of nitrification by the exhaustive experiments of Schützenberger and Warington. But even in the case of our own bodies, it is probable that all the changes, physiological as well as pathological, are dependent upon those minute workers, so that the terms "vital action," "vital force" used by older writers, were not such misnomers, after all, even allowing that those who used them had very little nction of how the said actions or forces worked or were evolved. We must thus look upon this bacterial or microbial underworld not as an utter enemy, but as a mighty agency for good or evil, as the case may be; we see that we could not exist without it, nor can we in some cases continue to exist in company with all of it. Our cue would seem to be to help the friendly microbes, and to fight those that are our foes. A good general rule, but how is it to be carried out? Clearly the first thing to do is to learn to recognise friends from foes, a process that can only be the outcome of long and careful experiment, such as is now being carried out both abroad and at home, in spite of much opposition and difficulty. . . . .

The methods of inquiry by the cultivation of organisms, as regards drinking water at least, have not yet produced much practical result, although sufficient evidence has been obtained to show that we are likely to obtain important information in that direction. But until we can go further in the recognition and detection of different organisms, and establish their connexion with particular forms of disease, we are working pretty much in the dark. But, as they say in German, "*verschoben ist nicht aufgehoben*"; and we may hope that further experience will give us more knowledge and more confidence. It is a fortunate thing, however, that we are less dependent upon this knowledge for the carrying out of prophylactic measures than might be supposed, for, even if we possessed it, it would not materially alter at present our course of action. It is shown that pathogenic bacteria (or what are believed to be so) propagate best under unhygienic conditions, light, fresh air, and pure water being inimical to them. It is also admitted, even by those who pooh-pooh the germ theory, or indeed any specific disease cause, that unhygienic conditions demand to be remedied, and that pure air, pure water, wholesome food, and the other conditions which make the sum of hygiene, are imperative if man or animal is to be maintained in health. The Committee at the India Office, which was assembled to consider the question of the Comma Bacillus and the report of Drs. Klein and Heneage-Gibbes, came to the conclusion that Dr. Koch had not proved the absolute connexion of the bacillus with cholera as an efficient cause, but at the same time they said that even if the contrary had been the case it would not in the meantime have altered things in so far as to compel the authorities to make any material change of procedure in the measures taken for prevention. Quarantine of all kinds was condemned as useless, and not only useless, but as in every way pernicious. There remains for preventive medicine, until we have far more extended knowledge of pathology and etiology, the steady path that is being already trod in the direction of providing for the purity of all articles of food and drink, of dwellings, of clothing, of persons; the supply of fresh air, and the immediate and complete removal of all refuse and effete matter. If to this we add a proper mode of life, both physically and morally, we may practically snap our fingers at both bacterium and bacillus. In the meantime, there are diseases among us which those measures seem as yet powerless to prevent, such as small-pox and hydrophobia. Under these circumstances, we should be foolish not to accept such help as vaccination, for instance, affords, although it might be difficult, even if it were considered necessary, to induce the public to be inoculated with hydrophobic matter, except under the terror produced by having been actually bitten. These measures, however are the adjuncts of hygiene, which aims at operations on a wider scale, by sterilising the soil on which the malignant microbe seeks to flourish, so he shall no longer consider suffering humanity to be his rightful heritage.

ARCHITECTURAL ASSOCIATION SATURDAY VISITS.

THE Architectural Association on Saturday made an afternoon visit to Combe Warren, the residence of Mr. E. Currie, built from the designs of Mr. Devey.

The plan of the house is charmingly irregular, the rooms being arranged to focus on a dell in the grounds. The general arrangement is a saloon, approached from the entrance-hall by a corridor, which also connects the saloon with the conservatory. From this saloon the dining-room, library, and drawing-room are entered, and on the side is the principal staircase separated by an oak screen. On the first floor is a similar arrangement, the principal bedrooms being reached from this upper saloon. A curious feature in the design is that each room is treated in a different phase of architecture, the drawing-room being Elizabethan and the other rooms in later styles. The saloon has a wide carved oak chimneypiece, with seats in the chimney corners, and iron dog-grate and wood fire. Adjoining the dining-room is a summer dining-room open to the air. The walls of this alcove are treated with plain tiles broken into irregular shapes and set in cement, and rubbed to a smooth surface. The effect is good.

The chapel, which is off the service-corridor on the ground-floor, has also a room communicating with it on the first floor. The interest of the house is greatly enhanced by the valuable furniture it contains. There are some interesting specimens of garden architecture in the grounds.

The Dutch garden, laid out with tile walks and formal beds, has a wrought-iron railing and gates from a church at Derby. On one side of this is the orangery, and at the end an octagonal house has recently been built for the specimen bay trees. The walls of this building internally are decorated in sgraffito.

It is difficult to realise that the house is entirely modern, the different styles of the various buildings, and the irregular plan, all give it the appearance of an old house that had been added to at various dates.

WORKSHOPS AT PUBLIC SCHOOLS.

SIR,—I have read with great pleasure the article in your issue of the 11th inst. [p. 369], on the advantage,—I had almost written the necessity,—of workshops at public schools.

It is unnecessary to add one word in support of your advocacy of the knowledge of the use of tools as an important item in the curriculum of all our public and private schools, but while such knowledge may be regarded as an attractive and useful accomplishment to many of the boys educated at public schools, it is of far greater importance to the large number trained and educated at our public charitable institutions. It is the duty and object of these latter as much to train them in a way to earn their living as to impart a general education, and it can hardly be necessary to point out how conducive to this end is a knowledge of the use of tools.

Those who are engaged in the management of large charitable institutions well know how difficult is frequently the placing of boys in suitable situations on their leaving the charity. Trades in this country generally, and perhaps still more in the metropolis in particular, are already so over-stocked that even if young boys are apprenticed to cigar-makers, tailors, or shopkeepers, it is more than doubtful if they can earn their livelihood when the term of apprenticeship has expired. I believe it would be a far greater service to the boys if our great charitable institutions were to retain them till such age as would permit of their being sent to our Colonies or to the Western States of America, and in these new countries it is impossible to exaggerate the importance of a knowledge of the use of tools and the rudiments of plain and solid geometry.

I observe you write, "the use of the workshop would, of course, be confined to play-hours." I doubt if this should be at public schools, but I am strongly of opinion that it should not be the case in an institution designed to train boys

who are dependent on their own earnings for their livelihood almost immediately on leaving school. For such boys a large portion of the knowledge at present imparted at most of our orphan asylums is wholly useless. The population of many towns, the existence of which is never likely to concern them, the length of rivers, and the height of mountains in various parts of the world, are all details which are only acquired after the expenditure of an immense amount of time and labour by teachers and pupils, and are forgotten almost as soon as learned, without any loss to the pupil. Instead of this, how much more useful and how little more expensive would it be to impart to these boys some knowledge of tools, which would never be lost, which would be of far greater service when possessed, and the acquisition of which would be a source of attraction instead of an effort of frequently overstrained brain power.

Being myself firmly convinced of the value of such knowledge, I am erecting at the orphan asylum of my own community at Lower Norwood, with the sanction of the Board of Management, a workshop which is designed by Mr. Lewis Solomon, and which it is my intention to equip with benches, tools, and, later on, with lathes. The managers have consented to appropriate the requisite number of hours (probably some four or five per week) to the training of the boys to a knowledge of the use of tools both for wood and metal working. It is intended to appoint a competent instructor to attend twice a week to teach the boys in the workshop, and I am sanguine that the experiment will be of invaluable service to those who are instructed.

If it should be attended with the hoped for success, I shall endeavour to induce the Board of Management of the London Orphan Asylum at Watford, of which it is my privilege to be a member, to adopt the same course as we are doing at Lower Norwood.

I believe that if these two well-known orphan asylums were to be known to have adopted some such plan as I have here briefly described, the movement would gradually extend, and the orphan asylums of the country will thereby have gone far in practice towards that at which they aim in theory, viz., standing in *loco parentis* to the dependent and frequently friendless children who enter their walls.

BENJAMIN L. COHEN.

30, *Hyde Park-gardens, September*, 1886.

THE ROMAN BATHS OF BATH.

SIR,—In your paper of the 11th [p. 370] are a few notes on the above. Enclosed are tracings showing the Roman work, as also the proposed new work.

The state of affairs is briefly this. At what is termed "The King's Bath" establishment (adjoining the pump-room) there are eighteen baths and dressing-rooms, previously twenty-four, six having been destroyed in the excavations. It was then proposed to add to these by building six bath and dressing rooms on the Roman floor level, and twenty-two on the upper floor, 18 ft. above.

We urged that these basement baths would obliterate the Roman work, and that on sanitary grounds alone they should not be built, inasmuch as they would be below the level of the winter floods, and thereby deteriorate for long periods the atmosphere of the whole establishment; they would also be below the sewer level and render necessary the fouling the hot-water culvert.

We were met by the assertion that our plan of the Roman work was hypothetical, &c., which I answered by offering to uncover the remains free of expense to the corporation, if not found as my plans described. They have now in great part been uncovered, and the only portion I had described as possibly fragmentary, is much more perfect than could have been anticipated. The parts in course of destruction I have coloured on tracing, giving the bird's eye view.

I take it you are acquainted with the large rectangular bath, possibly with the circular one also. The former, no doubt, served for natatory sports and swimming exercises principally, but the circular bath, the caldarium with its hypocaust, præfurnium, and labrum, and are the very nucleus of the bathing system of the Romans, and yet are now being destroyed.

The Town Council and many of the Baths Committee wished the preservation of the remains, but the Chairman of the Committee and the architect (Mr. Davis) turned the scale adversely. It was arranged that the Society of Antiquaries should be asked to report upon the matter, and for that purpose Professor Middleton came down, but by some means the destructionists were alarmed, and, with scant courtesy (a term almost too mild), the Society was ignored, and an "independent authority" was sent for. But instead of having the pros and cons before him, a groove of misrepresentation guided him, and the plan placed in his hands showed but a portion of the scheme. In addition to this, he was told these baths were absolutely necessary, and, equally so, they must be placed on this very site. So misleading was the information that we read in the Report, "None of the Roman walls, as I understand, are to be destroyed; and no parts essential for the understanding the original plan are even to be lost to view." But, sir, the day following that of Mr. Penrose's visit saw the hypocaust cut through for several foundations, and on these, in the caldarium, a chamber 29 ft. by 18 ft. 6 in. is in course of construction, the walls of corridors, attendants' rooms, steam closets, and staircase; whilst the adjoining circular-ended bath is to be almost filled with the masonry necessary to support the superstructure; and the remaining area of its chamber occupied by steps, wheel-chair incline, and corridor. These are the reasons of the disputes you have "noticed from time to time," and now we ask your powerful aid, and that of your readers, in ensuring that all who come to see these remains, whether the numerous casual visitors or the cultured scholar, shall be able to pass from threshold to threshold, and find these chambers free of all encumbering rooms and staircases; so that at a glance they might recognise the complete and skilful plan, and by it learn the full arrangement of the bathing system of the Romans, how developed, as can nowhere else be seen.

RICHARD MANN.

*** We expressed confidence in Mr. Penrose's judgment on the case; of course, if it appears that Mr. Penrose was not given correct information as to what was to be done, that alters the position. We have before expressed our opinion that the Roman remains at Bath are of quite exceptional interest, and that even some sacrifice of public convenience may be called for in order to preserve them. From a letter by Mr. Mann in a local journal, it appears that he is not properly informed as to Mr. Penrose's position and acquirements as an archæologist.

EPISCOPAL HERALDRY.

SIR,—I was disappointed on looking through Saturday's *Builder* to find that the subject of the armorial bearings of sees of recent creation had not been taken up, and hope some one will yet come forward and deal with it.

Consulting the "Newcastle Diocesan Directory," I found it impossible to decipher the charges of the Newcastle shield. On referring, however, to Burke it is thus emblazoned:—

"Per fess az. and gu. In chief, a representation of the cross of St. Cuthbert, or. In base, three castles, 2 and 1, arg."

Can any one say where the said cross is to be seen, or where there is an illustration of it giving any definite detail, and an idea of its size?

In the "Directory" illustration referred to above, it can only be described as a bad attempt at the ground-plan of a public fountain with four flights of steps leading thereto.

EXHAM PHILLIPS.

Manchester.

SANITATION AND FINANCE.

SIR,—In your number of last week [p. 407], you mention the improvements being made in the sanitary arrangements of the houses at Chiswick under the surveyorship of Mr. Ramsden. I quite agree that the alterations to the sanitary appliances are a great improvement to the houses, and of benefit to the occupiers; but how about the owners of the houses who do not receive one penny extra rent for this outlay, and who possibly have lost tenants who objected to remain while drainage alterations were in progress? No one seems to study them. The middlemen are looked upon as a sort of inevitable curse, instead of the real blessing they are, whether in the building trade as house-owners, or in any other occupation. In the Chiswick case I happened to act for, I believe, the largest house-owners in Grove Park, and my clients, beyond the actual loss caused by these sanitary improvements, are none the worse for the alterations. In another instance where I am indirectly concerned, a client who owns some fifty houses has had notice served upon him by the water company to alter all his fittings, at an outlay of about 250*l*. Here, again, my client obtained no benefit whatever from the alteration, and his difficulty is where to find the money, all his spare capital having just been expended in constructional and decorative repairs and sanitary alterations to these very houses. The houses are already mortgaged to their full mortgage value, and his only resource is the money-lender at 60 per cent.

Surely some help should be given by the parish or other authorities, who should be compelled to lend, say, two-thirds of the outlay at an interest not exceeding 5 per cent., as is frequently permitted in roadmaking. Over and over again I have seen mischief occasioned by the public real or fancied improvements from this cause, and owners would willingly assist in making improvements if their good intentions were not crippled by the want of large sums of ready money.

L. S.

Sept. 21, 1886.

The Student's Column.

STONE QUARRIES.—XIII.

ABERDEENSHIRE GRANITES (*continued*).

KEMNAY QUARRIES.—These quarries are situated about seventeen miles north-west of Aberdeen, and the stone is worked on a very extensive scale.

The granite is quite different in appearance from any of that of the Aberdeen quarries yet described. In comparison with them it is coarse-grained, though, speaking of granites as a whole, it might be more properly called medium-grained. Its general colour is a speckled grey. The quartz is white and in a granulated condition, forming a great proportion of the stone. The felspar is also white, being minute in the ground mass, but in distinct and larger twinned crystals distributed throughout it. These crystals do not appear to lie in any definite direction, and this considerably adds to the strength of the rock. The mica is the peculiar feature of the stone: both black and white varieties being present, but not very abundantly. The black mica is rather small, the specks not being very close together. The white, or silvery brown, mica occurs both as small and large crystals, and some of the latter are quite 7 mm. across, and correspondingly thick. Moreover, the lie of the crystals appears to be tolerably regular, and they are of much use in aiding the mason in the determination of the direction in which the stone will most easily split. This is somewhat curious, as it supplies the want created by the felspar in this respect.

We may mention that in one of the Kemnay quarries a steam crane raises the stone from the bottom of the workings to the height of nearly 300 ft. The machinery in connexion with this quarry generally, is of a very novel and substantial nature.

The granite is largely raised for building and engineering purposes, having been used in the construction of docks at Hull, Newcastle, Shields, Sunderland, and Leith; and is now being utilised for the piers of the Forth Bridge.

Tom's Forest Quarries.—These quarries are about half way between Kintore and Kemnay. The stone is very similar in appearance to that from the latter place, except that it is a little darker in colour; the crystals are not quite so large. The mica is black, and not very abundant. Here and there this mineral occurs as conspicuous black flakes, but it is more often seen bordering the other minerals, especially the felspar. The quartz is not so granulated, and is much more easily distinguished by its transparent glassy lustre than that in the Kemnay stone.

The rock as a whole is compact, and is, no doubt, a serviceable material, capable of being comparatively easily worked.

Tyrebagger is a large and well-known quarry near Aberdeen. The stone which is of a grey colour, is composed of quartz, two felspars (orthoclase and oligoclase) and mica. Large quantities of kerb and paving-setts are annually raised.

Corrennie Quarries.—These quarries have only lately been opened, but are extensively worked. The stone is quite different from the ordinary Aberdeen or Peterhead, both in mineralogical constitution and appearance. It is of a salmon colour, and might be described as a crystalline granular mixture of quartz and felspar, much resembling some of the Archæan rocks of North Wales. When a large polished block of the stone is looked at, little black specks are seen here and there. These are either black mica or hornblende, as the case may be. The quartz in the Corrennie stone is mostly pure white, smoky crystals being the exception. Although at least half the stone is quartz, this mineral does not occur in very large crystals; several small and broken-up pieces are often found close together, and sometimes enclose one of the accessory minerals alluded to. The felspar is of a salmon-coloured tint. It is not porphyritic, though occasionally orthoclase crystals are seen, nearly 1 in. in diameter. The general appearance of the mineral is in small and jagged pieces, and it closely follows the quartz, filling up little cracks and spaces.

One of the peculiarities of the stone in this district is that the base of the Corrennie hill is composed of grey granite, and the uppermost part red. The grey rock contains much mica and hornblende, whilst the felspar, being pink and white, gives the stone a very charac-

teristic appearance. We notice that a slight porphyritic structure is set up near the junction of the two kinds of stone. Iron pyrites is found in the lowermost stone, but being the cubical variety, does not detract from its value.

A large quantity of the Correnie stone is now being used in the erection of the new Glasgow Municipal Buildings, and in the Tay Bridge.

2.—The Peterhead District.

The outcrop of granite in this area is not very large, but the extensive and systematic manner in which the stone is raised has rendered it famous in the market, where it is known as "Peterhead" granite. In the greater number of the quarries there is a considerable "bearing" over the rock, varying in depth from 3 ft. to 20 ft. The first operation in removing the stone is to bore holes of varied depths, according to circumstances, up to 30 ft., having a diameter of 2 in. to 3 in. These are charged with powder for the purpose of dislodgment. The blocks removed are cut with wedges, as previously described. The rock differs widely in chemical and mineral constitution, according to the part of the mass from which it is obtained. As the greater part of the stone is polished its durability is thereby rendered very much greater than if it was left in the rough. Rain does not have an opportunity of accumulating in little dents and holes, thus giving the acids no time to act; directly rain beats against the polished surface it glances off again. We see, therefore, that not only does polishing greatly add to the beauty of granite, but it assists in preserving it from decay.

Longhaven Quarries.—The granite quarries on the Longhaven Estate are about five miles from Peterhead, and close to the sea. A range of granitic rocks faces the North Sea from Port Erroll to Boddam, a space of about four miles, and some of the most important quarries in Aberdeenshire are situated within these limits. The oldest quarry in the district is at Stirlinghill, which is on the Boddam Estate. Eight quarries are at present in full operation on the Longhaven property, with an average of twenty men at work in each: sometimes this average is considerably raised, according to the state of trade. Some of the quarries have been worked for about forty years, but the majority of them have only been opened within the last twenty years. They are quarried principally (almost exclusively) for blocks, suitable for polishing. A brisk trade is, however, done by some of the quarries in providing principal stones for buildings in the neighbourhood, but a large amount of excellent building material is thrown into the sea, which affords a cheap and easy mode of disposing of superfluous stone. It is a pity this cannot be utilised in buildings in the cities of the south, where soft limestones and the like so soon decay. Surely it would pay for carriage?

The stone itself is of a red colour, and slightly differs in grain in some of the quarries. The quartz is very peculiar, and is a marked feature in the rock. It occurs as rounded crystals, some having a smoky appearance, others being white and transparent. Dark patches are seen on the stone, which, at a distance, might easily be mistaken for some distinct accessory mineral. A close examination, however, soon reveals the fact that they are quartz. The felspar is of a flesh-red colour and mostly orthoclase. In some of the coarser materials this mineral is in oval crystals of a milky white tint, and rarely yellowish green,—not unlike the light green felspar in some of the Cornish granites. It is very evenly distributed, and forms a large percentage of the rock. It has no tendency to become porphyritic, and as no twinning is perceptible, is not regular, and the crystals are much interlocked; the stone cracks with a splintery fracture, the felspar looking much broken up. This mineral is very hard, and is so completely crystallised as to render the stone more durable than it would otherwise be, even in spite of the presence of so much peroxide of iron. The quantity of mica present is very variable. Large blocks from quarries in the southern part of Longhaven occur, in which not a particle of this mineral is seen, and the rock then usually contains much hornblende, being, in fact, a syenite; and there is every gradation, from a syenite through hornblendic granite to granite properly so called. The mica, when present, is black. Hornblende occurs in very minute crystals, congregated together so as to form dark green patches. It is a curious fact that when hornblende replaces mica in the Peterhead stone, the general appearance of the rock is not altered to an appreciable extent, so that, although the weathering of it must vary accordingly, the cause of the difference in durability would not, on a superficial examination, be suspected.

Notwithstanding the small area of granite on which these quarries are situated, the extent of unbroken ground suitable for quarrying in the district is still considerable. This is testified by the large and perfect blocks that come to light when a clearing is made.

The stone from the Longhaven quarries is used very extensively in London, whilst large quantities of it have been sent to America and other parts of the world.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,674, Flushing Cisterns, &c. W. H. B. Kimber.

The object of this invention is to prevent noise in the action of syphons in flushing cisterns. When the cistern is charged, the float rises and shuts off the cock, the cistern then being ready for use. When the syphon is started the float descends, opening the cock, admitting air and relieving the syphon before air can gather with the water at the bottom of the syphon. The action is thus rendered noiseless.

12,250, Chimney-pots, &c. R. J. White.

To prevent down-draught and to create greater up-draught in chimneys, the chimney-pot is formed with a tube or pipe inside it, which confines the air and causes a greater up-draught and prevents the down-draught. It can be made stationary or to swing round and take the full wind whichever way it blows.

5,235, Telescopic Ladder. W. O. Jenkins.

This is a telescopic ladder made in three parts, with the top and middle parts moved simultaneously by a rope or chain and a winch, worked on the lower ladder. It is designed for the use of house-painters, builders, and others, as well as for fire-escapes and such like uses.

7,674, Manufacture of Cement. H. Mathey (New York).

This is a further process to others previously devised by the same patentee, in which the process described indicates that the cement rock is ground previously to burning. In this process of manufacture the methods of grinding and burning, as used in making Portland cement, are closely followed. The natural cement rock is first crushed to a suitable degree of fineness, then alluvial clay is added to supply alumina and silica in proper proportions, and the ingredients are finally burned under agitation so as to form the double silicates of lime and alumina.

NEW APPLICATIONS FOR PATENTS.

Sept. 10.—11,542, B. Ludwig, Decoration of Wood, &c.

Sept. 11.—11,561, W. Gibbons and W. Sabell, Window Sash Fastener. — 11,583, C. Joliffe, Purifying Air for Ventilating and Temperating Rooms.

Sept. 13.—11,590, E. Baufield, Indicating Apparatus for Water-closets, &c.—11,596, J. Deeley, Lavatories, Baths, Sinks, &c.—11,607, R. Lindsay, Fastenings for Window-sashes.—11,613, H. Macevoy and Others, Portland Cement.—11,621, W. Popplewell, Telescopic Ladders.

Sept. 14.—11,637, M. Macleod, Dry Glazing.—11,669, H. Hunt, Kitcheners.—11,679, T. Smith, Twist Nails, Spikes, or Screws.—11,682, A. Slatter, Indicator for Hotels, Factories, &c.

Sept. 15.—11,712, J. Porter, Wall Brackets, &c.—11,733, T. and R. Wood, Stable Fittings.

Sept. 16.—11,745, J. Macmeikan, Windguards.—11,766, T. Carter and W. Tully, Producing Induced Draught in Chimneys of low altitude.—11,775, J. Helles, Tile Stove, &c.—11,782, A. Barratt, Screwdrivers.—11,792, Viscount Grimston, Water-waste Preventers.—11,798, R. Knight, Hot-water Pipes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,969, J. Rainer, Ventilator and Chimney Cowl.—9,797, W. Hammond and J. Turner, Fastening for Revolving Shutters.—9,895, G. Rayner, Retaining Catches for Doors.—10,199, S. Pratt, Fastening and Alarm for Doors, Shutters, &c.—10,573, J. Rankin and W. Palmer, Sash Fasteners.—10,887, H. Brand and W. Harper, Hinges.—10,913, P. Lapierre, Cooking Stove.—11,036, F. Northall, jun., Hinges.—11,092, F. Garon, Securing Door Knobs to Spindles.—10,182, J. and T. Breakell, Preparation of Calcareous Stone or Marble for Decorative Purposes.—10,574, A. Drummond, Manufacture of Glass, &c.—10,836, J. Stow, Screw Fasteners for Windows.—10,876, J. Pawsey, Painting Brushes.—10,920, F. Henson, Bolts for Fastening Doors.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

11,771, J. Knott, Dovetailing, Mortising, Tenoning, Tongueing, Grooving, and Moulding Machines.—13,766, W. Lindsay, Fireproof Floors.—13,841, H. Ashley, Cooking Stoves.—4,378, J. Barnes, Syphon Cistern.—9,496, C. Bellamy, Plumbers' Blowpipes.—14,128, J. Spence, Paint.—4,164, D. Breaknell and T. Mallett, Soldering Iron.—10,526, 10,528, and 10,529, W. Alvord, Knob Attachments.—10,530, A. Boult, Water-closets.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

SEPTEMBER 13.

By BROWN & FOULKES.

Bucks, Marsworth—Two freehold houses	£270
Freehold orchard, containing 2a. 3r. 2p.	600
Thirteen freehold cottages	835
Bucks, Wendover—A piece of freehold garden ground	22

SEPTEMBER 14.

By W. HOLLIER.

Russell-square—2 and 3, Keppel-street, 11 years, ground-rent 29*l.* 12s.	400

By J. S. BRIDGMAN.

Surrey, Caterham—A plot of freehold land	12

By H. RUTLEY.

Camden Town—77 and 79, Arlington-road, freehold	1,700
Euston-square—73, Euston-street, 33 years, ground-rent 6*l.*	425
Camden-road—4, Hilldrop-crescent, 62 years, ground-rent 8*l.*	580
Hampstead—1, Heath-villas, 75 years, ground-rent 8*l.*	190

By R. A. NOTLEY.

Cornwall, Killerton—The South Phœnix and Caradon Mine, 17 years	510

By W. R. NORRIS.

Streatham, Lewin-road—The residence, Shenley Villa, 96 years, ground-rent 10*l.*	725

SEPTEMBER 15.

By J. HIBBARD.

Hoxton—15, St. John's-road, 36 years, ground-rent 16*l.* 16s.	105
Highbury—39, Ferntower-road, 64 years, ground-rent 6*l.* 6s.	450

By F. HARDS.

New Cross—357, New Cross-road, freehold	1,370
Camberwell—5, North-terrace, 31 years, ground-rent 13*l.* 3s. 6d.	500
Lewisham, Morley-road—The residence called Clevenden, 73 years, ground-rent 13*l.* 12s. 6d.	570

By A. & A. FIELD.

Mile End—62 and 64, Lichfield-road, 56 years, ground-rent 5*l.*	645
Bow—1a to 4a, Stephen's-road, 76 years, ground-rent 20*l.*	1,315

By FAREBROTHER, ELLIS, & Co.

Sussex, near Steyning—The mansion called Highden, and 472a. 0r. 9p., freehold	30,100
Wappington Farm, and 432a. 0r. 10p., freehold	12,200
Staplefield Farm, and 133a. 1r. 33p., freehold	5,050
Rudgwick, near—Hope Farm, and 186a. 3r. 21p., freehold	3,500
Billinghurst, near—Oakhurst Farm, and 52a. 1r. 11p., freehold	9,000
Rowner's Farm, and Corn Mill, 87a. 2r. 6p., freehold	3,650
West Chillington—Nyetimber Farm, and 159a. 1r. 29p., freehold	3,225
Southwater—Trawlers Farm, and 324a. 3r. 2p., freehold	3,700
Barcombe—Balneath and Knowland Farms, and 785a. 1r. 37p., freehold	11,000
Holmwood and Great Holmwood Farms, and 394a. 1r. 27p., freehold	5,050
Lackenhurst Farm, and 110a. 1r. 23p., freehold	1,100
The Manor of Nyetimber, with its rights, &c.	740
The Manor of Balneath, with its rights, &c.	1,600
The Manor of Twineham Benefield, with its rights, &c.	200
Enclosures of freehold detached lands, 19a. 1r. 35p.	1,490

By TOPLIS & HARDING.

Hackney—54, Weymouth-terrace, freehold	410

By WATERS & RAWLENCE.

Reversion to one-sixth of 9,018*l.* 7s. 10d. New Three per Cent. Annuities, and in various freehold properties at Wilton (Wilts), life aged 70 years	1,050

SEPTEMBER 16.

By E. STIMSON.

Brixton—122, 165, and 167, Ferndale-road, freehold	985
30 and 32, Vassall-road, 14 years, ground-rent 18*l.*	270
East Dulwich—1 to 5, Lacon-terrace, 92 years, ground-rent 25*l.*	950
Bermondsey—6, 7, and 8, Edward-street, freehold	520
Walworth—58 and 60, Elstead-street, 24 years, ground-rent 9*l.* 9s.	280
Peckham—A ground-rent of 25*l.* 4s. per annum, term 90½ years	485
169, 171, 173, 185, 187, and 189, Shakspeare-road, 86 years, ground-rent 33*l.*	1,400

By INMAN, SHARP, & HARRINGTON.

Blackfriars—71 and 72, Hatfield-street, 9 years, ground-rent 12*l.* 12s.	150

SEPTEMBER 17.

By C. & H. WHITE.

Blackfriars—Ground-rent of 12*l.* 12s., term 9 years	90
Kennington—50, 52, 54, and 64, St. Mark's-road, 12 years, ground-rent 24*l.*	360

Obituary.—The death is announced, at the age of seventy-three, of the distinguished Danish painter, Augustus Thomsen. His works were chiefly of a historical character, one of the best known being the frieze representing the "March of Alexander the Great," in the royal palace at Christiania.

Miscellanea.

The Iron Spire of St. Stephen's, Vienna.—The tower of the ancient church of St. Stephen, Vienna, which is supposed to have been founded in 1144, was greatly injured by an earthquake in 1519, and it was necessary to restore it. In course of time it deviated out of the perpendicular to a considerable extent. An iron bar was carried through it as an axis for the support of the spire, which, having a considerable tendency to vibrate, might be considered as an element of destruction rather than of strength. Consequently the thin wall of the lower portion of the spire was reduced almost to ruin; and at length was in such a dangerous condition as to require rebuilding. The removal of the old spire was commenced in August, 1839, and in the following spring all the condemned parts had been removed. The mode of construction adopted in the restoration was novel and ingenious, the slight masonry of the spire being supported by means of a framing of vertical iron ribs, fastened at their lower extremities to a cast-iron plate or base, and united to each other at intervals by horizontal rings of rolled iron. These rings are made to project from the inner surface, so as to admit of a person ascending, with the assistance of ladders, to the top of the spire. All the wrought and rolled iron employed in the construction of this iron skeleton, the weight of which was only 123 cwt., was manufactured in the Government works at Neuberg, in Styria. The cast-iron plates or rings were furnished from the Government ironworks at Mariezell. In the autumn of 1842, when the whole of the masonry of the spire had been completed, the uppor portion, consisting entirely of ironwork, was fixed. This also was attached to a strong cast-iron circular plate, similar in construction to that below. This portion of the framing, with the other ironwork employed in the spire, weighed about 80 cwt., so that the entire weight of iron was about 203 cwt. The new portion of the spire was connected to the old by means of an arrangement of iron anchor fastenings. The portion of the spire restored (viz., from the gallery of the tower to the top of the cross) is about 182 ft. high, the cost having been about 130,000 gulden (13,000*l.*), of which sum 15,500 gulden were expended in taking down the old spire and in the construction of the necessary scaffolding.—*Iron.*

Guildford. — On Wednesday morning the Mayor and a number of members of the Urban Sanitary Authority attended, with the Medical Officer and the Borough Surveyor, at Dapdune Wharf, for the purpose of inspecting the arrangements made for applying Mr. Conder's iron process to the drain. The borough surveyor first filled three cylinders, which contained about seven pounds of sulphate of iron. Each cylinder is made of perforated zinc, closed at one end with porcelain, iron being found not to stand the chemical action. These were placed in a tank which was supplied with water from the town supply, and acted upon the sulphate of iron with the other ingredients used by the inventor. The liquid resulting was allowed to fall into the drain. After a short interval the party proceeded to near the outfall at Dapdune Wharf, some 300 yards distant, and a sample bottle was taken from the drain. Although there was an evident improvement in regard to smell, the characteristics of the contents of the bottle, as far as the eye could judge, had not materially altered. Mr. Conder had, however, stated that the sulphate should be given longer time, in fact some three or four hours, before its proper action would have been observed. After waiting about another twenty minutes or half an hour, another sample bottle was taken, with the result that a very marked change was observed. The chemical action was distinct and active, and the sediment settled rapidly and freely.—*Surrey Advertiser.*

New Board School, Harborne. — At a special meeting of the Harborne School Board recently, consideration was given to the competitive plans for schools in the district locally known as "The Cape." It appears that in response to the advertisement eighteen sets of plans were received. After a careful examination of these the Board decided to adopt those bearing the motto "Playground." The premium of 20*l.* offered by the Board for the second design in order of merit was provisionally awarded to the author of the design marked "Rex," the plans bearing the motto "Experience" (in blue letters) being highly commended. The authors of these designs were afterwards found to be as follow:—"Playground," Mr. G. H. Cox, 26, Temple-street, Birmingham; "Rex," Mr. Daniel Arkell, 1, Temple-row, West Birmingham; "Experience," Mr. Fred. J. Gill, John-street, Smethwick.

York Architectural Association. — On Saturday last a party of members of this Association paid a visit to Sledmere, the seat of Sir Tatton Sykes, Bart. On arriving at Wharram from York, conveyances were in waiting to take the party over the Wold district. A short stay was made at Wharram-le-Street Church, where the Vicar pointed out the objects of interest, particularly the horse-shoe arch in the tower and the Norman font. From hence the party proceeded to Kirby Grindalyth, where they were met by the Rev. Newton Mant, vicar of Sledmere, and honorary member of the Association, who, together with the Vicar, described the church, which is one of the many churches on the Wolds restored by the munificence of Sir Tatton Sykes, Bart. The church, dedicated to St. Andrew, has an embattled tower at the west end, surmounted by an octagonal spire, which was blown down previously to its restoration in 1839. The turrets at the angles of the tower were added by the late Mr. Street. The brick nave of 1827 has given place to the new nave, designed by Mr. Street, who restored the whole church and erected the stone lych-gate. Leaving Kirby, the party, under the guidance of the Rev. Newton Mant, traversed the undulating country to Sledmere, and after visiting the vicarage and the school, proceeded to Sledmere House, where they were entertained to tea by Sir Tatton and Lady Sykes. At the conclusion the President (Mr. Pollard) moved a vote of thanks to Sir Tatton and Lady Sykes, and to the Rev. Newton Mant. This was seconded by Mr. W. G. Penty, and carried by acclamation.

River Tyne Improvements.—The Tyne Improvement Commissioners, at a special meeting held recently, in Newcastle, under the chairmanship of Mr. J. C. Stevenson, M.P., decided to remove Whitehill Point, at a cost of 30,000*l.*, with 24,000*l.* for a timber quay, and 36,000*l.* for staiths for the Backworth Coal Company. The removal of the Point has long been contemplated as an important work, but a colliery lease has hitherto delayed it. At the same meeting the Commissioners decided to spend 86,000*l.* this year upon river improvements. The following are the chief items:—On the piers, 30,000*l.*; towards the cost of removing Whitehill Point, 10,000*l.*; Albert Edward Dock, 10,000*l.*; removal of Friar's Goose Point, 6,000*l.*; dredging, 22,000*l.*

Protective Resemblance amongst Antiquities.—A correspondent of the *Gardeners' Chronicle* shows how an accidental resemblance of a useless relic to a useful object has been the means of its careful preservation. He mentions an incident of the recent meeting of the Cambrian Archæological Association, as reported in our columns. A so-called "stone pillory" was visited close to Llanrhidian Church. It is difficult to conceive of a "stone pillory," but the mystery vanished when the object was seen. The "pillory" was no other than a very ancient wheel cross (familiarly known as an Irish cross,—more common in Irish churchyards than in English), with the upper part broken off. A wheel cross is like a common gravestone with a broad-limbed cross at the top, the arms connected by a stone circle, like a cart-wheel with four broad flat spokes, the spaces between the spokes being circular or rudely triangular holes. The two upper holes had vanished with the top of the Llanrhidian cross, the two lower had been utilised as holes through which drunkards' hands could be thrust previously to their being tied in position with rope. The whole relic would long ago have been destroyed had it not, when broken, borne an accidental resemblance to a "stone pillory" with two hand-holes. The piscina is sometimes preserved as a lard and butter cooler. Font-bowls are often preserved as troughs for pigs, altar-slabs for door-steps, early Christian memorial stones for gate-posts and for "rubbing stones" for cattle.

Association of Municipal and Sanitary Engineers and Surveyors. — A Northern District meeting will be held at West Hartlepool on Saturday next, October 2nd. Members will assemble at 11·30 a.m. in the Commissioners' Board Room (kindly granted for the occasion by the Chairman, Lieut.-Col. Cameron). The business to be transacted includes the election of a local district secretary. The following papers will be read and discussed:—(1) "The Construction and Maintenance of Macadamised Roads," by Mr. J. W. Brown, C.E., F.G.S., Town Surveyor, West Hartlepool. (2) "Sea Wall Construction," by Mr. H. Mair, C.E., Borough Surveyor, Hartlepool. The members will afterwards (under the guidance of Mr. Brown and Mr. Mair) visit Mr. Trechmann's Cement Works and the Sea Wall now in course of construction at Hartlepool.

The Building Trade of Sweden.—As an example of the slackness of the building trade of Sweden may be mentioned that last week at Stockholm a large quantity of good quality red bricks only fetched 1*l.* 1s. 6d. per 1,000, as against 3*l.* 5s. for the same quality a few years ago.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS:

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Market Buildings	Carlisle Corporation ...	100*l.* and 50*l.*	Nov. 20th	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Lamp Columns	Willesden Local Board	O. C. Robson.....	Sept. 28th	ii.
Guernsey Granite (Broken)	do.	do.	do.	ii.
Making-up Road	Wandsworth Bd. of Wks	*Official*	do.	xiii.
Road-Making and Paving	Hammersmith Vestry...	do.	Sept. 29th	xiii.
Ironwork for Bridges	Midland Railway Co. ...	A. A. Langley	October 1st	ii.
Stoneware Sewer Pipes, Bricks, &c.	Harrow Local Board ...	F. N. Cowell.....	October 2nd	ii.
Broken Granite	Aldershot Local Board	W. L. Coulson	October 4th	ii.
Making-up Road	Lewisham Brd. of Wks.	*Official*.....	October 5th	ii.
Making-up Roads, &c.....	Tottenham Local Board	— De Pape	do.	ii.
Fittings for Iron Buildings, Southampton.....	Com. of H.M. Works...	*Official*	do.	ii.
Alterations, W.C. District Post-Office	Com. of H.M. Works...	*Official*	October 11th	ii.
Broken Guernsey Granite	Croydon Corporation...	do.	October 12th	ii.
Erection of Infectious Hospital	Kingston R.S.A.	Jacomb, Gibbon, & Woodroffe	October 13th	ii.
Reservoir, and other Works	Liverpool Corporation	G. F. Deacon	October 18th	ii.
New Infirmary	Parish of Birmingham..	W. H. Ward.....	October 25th	ii.
Rebuilding Smedley's Hydropathic Estab'mnt	.....	G. R. Statham	Not stated...	ii.
Enlargement and Additions to Schools	School Brd for London	*Official*	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor	Salford Corporation.....	130*l.*	October 9th	xvi.

Sale of a Building Estate in Kent.—The second portion of the Hawley Hill Estate, in the county of Kent, was submitted for sale on Monday last by Messrs. Baker & Sons. The estate, which occupies an area of between forty and fifty acres, is situated about midway between the Dartford Station of the South Eastern Railway and the Farningham-road Station of the London, Chatham, and Dover Railway, and is between two and three miles distant from the two stations. It stands upon very high ground, commanding a panoramic view of this portion of the county of Kent, both east, west, north, and south. Six roads, each 30 ft. in width exclusive of the footpaths, have been laid out on the estate, and altogether the number of houses and other buildings proposed to be erected on the estate is about 450. A numerous company left Cannon-street Station for Dartford, whence they started in wagonettes for the estate. The sale took place in a marquee there. The number of lots offered was 139, and Mr. Baker, in submitting them, observed that in the neighbourhood were several large manufacturing establishments, and the demand for small houses was so great that the lower and less-attractive portion of the estate had been sold without even the publicity of a public auction, and that building operations were now rapidly proceeding. On the sale commencing, the first forty-five lots offered, having frontages varying from 34 ft. to 18 ft., and a depth of 100 ft., were sold at prices ranging from 6*l.* to 10*l.* each; a public-house plot, having a frontage of 50 ft. and a return frontage of 132 ft., realising 36*l.* Twelve plots, having frontages of 17 ft. and a depth of from 144 ft. to 160 ft., were sold at 8*l.* 10s. and 7*l.* each, whilst the remaining plots, having frontages of 17 ft. and a depth of 100 ft., realised 4*l.* and 5*l.* each, the whole of the plots offered being disposed of.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	10	0	7	0	0
Teak, E.I. ....load	9	0	0	14	0	0
Sequoia, U.S. ....foot cube	0	2	4	0	2	7
Ash, Canada ....load	3	0	0	4	10	0
Birch ,, ...load	2	10	0	4	0	0
Elm ,, ...load	3	10	0	4	10	0
Fir, Dantsic, &c. ....load	1	10	0	4	0	0
Oak ,, ...load	2	10	0	4	10	0
Canada ....load	3	0	0	6	0	0
Pine, Canada red ....load	2	0	0	3	10	0
,, yellow ....load	2	5	0	4	0	0
Lath, Dantsic ....fathom	3	0	0	5	0	0
St. Petersburg ....load	4	0	0	5	10	0
Wainscot, Riga....log	2	15	0	4	0	0
,, Odessa, crown ....load	3	5	0	3	7	6
Deals, Finland, 2nd and 1st...std. 100	7	0	0	8	0	0
,, 4th and 3rd ....std. 100	6	0	0	7	0	0
Riga ....load	5	10	0	7	0	0
St. Petersburg, 1st yellow ....std. 100	8	0	0	14	0	0
,, 2nd ,, ...std. 100	7	0	0	8	0	0
,, white ....std. 100	7	0	0	10	0	0
Swedish ....std. 100	6	0	0	15	0	0
White Sea ....std. 100	7	0	0	17	10	0
Canada Pine, 1st ....std. 100	17	0	0	30	0	0
,, 2nd ....std. 100	12	0	0	17	0	0
,, 3rd, &c ....std. 100	6	0	0	10	0	0
,, Spruce 1st ....std. 100	8	0	0	11	0	0
,, 3rd and 2nd ....std. 100	5	0	0	7	10	0
New Brunswick, &c....std. 100	5	0	0	7	0	0
Battens, all kinds ....std. 100	4	0	0	12	0	0
Flooring Boards, sq. 1 in., Prepared, first ....sq.	0	9	0	0	13	0
Second ....sq.	0	7	6	0	8	6
Other qualities ....sq.	0	5	0	0	7	0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Cedar, Cuba....foot	0	0	3	0	0	3½
Honduras, &c. ....foot	0	0	2½	0	0	3½
Australian ....foot	0	0	2	0	0	3
Mahogany, Cuba ....foot	0	0	4	0	0	7
St. Domingo, cargo average ....foot	0	0	4	0	0	7
Mexican ,, ...foot	0	0	3½	0	0	4½
Tobasco ,, ...foot	0	0	4	0	0	6½
Honduras ,, ...foot	0	0	4½	0	0	6½
Maple, Bird's-eye ....foot	0	0	6	0	0	8
Rose, Rio ....ton	7	0	0	10	0	0
Bahia....ton	6	0	0	10	0	0
Box, Turkey ....ton	5	0	0	17	0	0
Satin, St. Domingo ....foot	0	0	7	0	0	11
Porto Rico ....foot	0	0	8	0	1	2
Walnut, Italian ....foot	0	0	4	0	0	5
METALS.						
IRON—Pig, in Scotland ....ton	0	0	0	0	0	0
Bar, Welsh, in London....ton	4	7	6	4	15	0
,, ,, in Wales ....ton	4	2	6	4	7	6
,, Staffordshire, London ....ton	5	10	0	6	0	0
Sheets, single, in London....ton	6	15	0	8	10	0
Hoops ,, ...ton	6	0	0	7	0	0
Nail-rods ,, ...ton	5	10	0	6	10	0
COPPER—						
British, cake and ingot ....ton	43	0	0	43	10	0
Best selected ....ton	44	0	0	44	10	0
Sheets, strong....ton	0	0	0	0	0	0
,, India ....ton	0	0	0	0	0	0
Australian ....ton	0	0	0	0	0	0
Chili, bars ....ton	41	2	6	41	10	0
YELLOW METAL....lb.	0	0	3½	0	0	4½
LEAD—						
Pig, Spanish ....ton	12	17	6	0	0	0
English, common brands....ton	13	12	6	13	17	6
Sheet, English ....ton	14	0	0	14	2	6
SPELTER—						
Silesian, special ....ton	13	12	6	13	15	0
Ordinary brands ....ton	13	10	0	13	12	6
TIN—						
Banca ....ton	0	0	0	0	0	0
Billiton ....ton	0	0	0	0	0	0
Straits ....ton	102	0	0	0	0	0
Australian ....ton	102	10	0	0	0	0
English ingots....ton	105	0	0	0	0	0
ZINC—						
English sheet ....ton	18	0	0	18	5	0
OILS.						
Linseed ....ton	21	0	0	21	7	6
Cocoanut, Cochin ....ton	33	0	0	33	5	0
Ceylon ....ton	25	10	0	25	15	0
Copra....ton	0	0	0	0	0	0
Palm, Lagos ....ton	23	0	0	23	10	0
Palm-nut Kernel ....ton	0	0	0	0	0	0
Rapeseed, English pale....ton	21	15	0	22	0	0
,, brown ....ton	20	5	0	20	10	0
Cottonseed, refined ....ton	18	0	0	19	0	0
Tallow and Oleine ....ton	25	0	0	45	0	0
Lubricating, U.S. ....gal.	0	0	0	10	0	0
,, Refined ....gal.	8	0	0	13	0	0
TURPENTINE—						
American, in casks....cwt.	1	6	6	1	6	9
TAR—Stockholm ....barrel	0	15	0	0	15	6
Archangel....barrel	0	10	6	0	11	0

TENDERS.

BETHNAL GREEN.—For the execution of certain works in repairs, new cistern, water-closet fittings, and external painting, at the Workhouse, Bishop's-road, Bethnal-green, for the Guardians of St. Matthew, Bethnal-green. Messrs. T. & W. Stone, architects, Great Winchester-street, E.C. No quantities:—

Sweeting	£1,675 0 0
Hammond	1,384 0 0
Wyre	1,245 0 0
Jackson & Todd	1,020 0 0
Godfrey	989 0 0
Thomason	988 0 0
Brown	960 0 0
Wood	955 0 0
Greatorex & Co.	935 0 0
Vigor & Co.	930 0 0
Wythe	875 19 0
Marshall	850 0 0
Simpson	849 0 0
Grigar	834 0 0
Hill	820 0 0
Salt	820 0 0
Lilley	686 0 0
Wilmot	680 14 8
Edwards	662 0 0
Peppiatt	559 0 0
Church	489 0 0

BOW.—For the enlargement of Leopold House, Burdett-road, in connexion with Dr. Barnardo's Homes. Mr. Ebenezer Gregg, F.R.I.B.A., architect, 1a, St. Helen's-place:—

Kilby & Gayford	£4,990 0 0
L. H. & R. Roberts	4,780 0 0
Claiter & Macey	4,760 0 0
Dowds	4,635 0 0
Johnson (accepted)	4,583 0 0

BRENTFORD.—For the erection of the Castle Hotel, is the High-street, Brentford, for Mr. John Brill. Mr. Fredk. W. Lacey, architect, Brentford. Quantities by Mr. J. Sargent, Holden-terrace:—

J. W. Faulkner, Old Kent-road	£4,987 0 0
T. Hiscock, Hounslow	4,775 0 0
J. C. Tennant, Willesden	4,697 0 0
Lansdowne & Co., Richmond	4,489 0 0
A. Reed, Stratford	4,484 0 0
Gregory & Co., Clapham	4,475 0 0
T. Nye, Ealing	4,390 0 0
J. Dorey, Brentford	4,388 0 0
C. Maton, Kew	4,189 0 0
T. Brunsden & Co., Brentford	3,819 0 0

CAPEL (Kent).—For infectious hospital, Capel, Kent. Messrs. H. H. & E. Cronk, architects, Tunbridge Wells:—

W. H. Canty, Tunbridge Wells	£3,239 10 0
Dore & Sons, Eastbourne	2,545 5 0
G. J. Jones, Tonbridge	2,500 0 0
Wallis & Clements, Maidstone	2,393 0 0
Denne & Son, Deal	2,387 0 0
J. Jarvis, Tunbridge Wells	2,380 0 0
T. Reeves, Staplehurst	2,297 10 0
Kirk Bros., Battersea	2,280 0 0
G. & F. Penn, Pembury	2,265 0 0
Davis & Leaney, Goudhurst	2,090 0 0
Miles Tulley, Paddock Wood	2,067 0 0

EXETER.—For police-court, station, and cells, for the City and County of the City of Exeter. Mr. John Morgan Pinn, architect, Exeter. Quantities by the architect:—

Woodman	£5,350 0 0
Scadding & Son	5,190 0 0
Gibbard	5,189 0 0
Stephens	5,058 0 0
Gibson	5,040 0 0
Phillips	4,892 0 0
Gooding (accepted)	4,750 0 0

HEXHAM.—For new premises, Cattle Market, Hexham, for Mr. John Young. Mr. Henry Grieves, architect, South Shields:—

Wm. Bland, Hexham (accepted)	£1,047 14 0

HOLLOWAY.—For alterations and bar fittings at the Mother Red Cap public-house, Upper Holloway, for Mr. James Baskett. Mr. Charles Young, architect, Strood Hill, Rochester. Quantities by the architect:—

Barton	£616 0 0
Mattock Bros.	590 0 0
H. Smith	567 0 0
Jackson & Todd	559 0 0
Turtle & Appleton	548 0 0
J. Higgs, Dorset-square (accepted)	489 0 0

[Architect's estimate, 499*l.*]

LONDON.—For works at the Unicorn Hotel, Norton Folgate, E.C. Mr. R. A. Lewcock, architect, Bishopsgate-street Within:—

Goodall	£499 0 0
Steel Bros.	430 0 0
Jackson & Todd	410 0 0
Ravey	396 10 0
Walker	350 0 0
Dainton	330 0 0
Gasfitter's Work.	
Price	247 3 6
Winn	238 10 0
Masterman	232 0 0
Christian	152 12 0
Steadman	125 0 0
Pewterer's Work.	
Pringle	46 0 0
Paddon	45 0 0
Heath	33 10 0
Phillips	30 0 0

LONDON.—For alterations at the Mitre Tavern, Chancery-lane, for Mr. W. Drew. Mr. H. I. Newton, architect, Queen Anne's-gate, Westminster:—

Hobson	£1,426 0 0
Burman & Sons	1,200 0 0
Mark	1,169 0 0
Drew & Cadman	930 0 0
Jackson & Todd (accepted)	920 0 0

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